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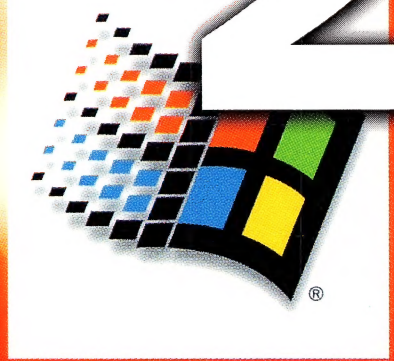
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- High-fidelity Audio SoundBlaster Compatible
- 24X Max Variable CD-ROM Drive
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- 32MB NVIDIA TNT2 M64 4X AGP Graphics Card
- 48X Max Variable CD-ROM Drive
- 15" Colour Monitor (13.7" v.i.s.)
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- Microsoft® OEM Works Suite 2000
- Norton Anti-Virus 2000
- Dell QuietKey Keyboard
- Microsoft® Intellimouse®
- Telstra Big Pond Business ISP Offer
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DELL DIMENSION™ XPS T600R DESKTOP

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- Mini Tower Model
- 256KB On-die L2 Cache
- 64MB 100MHz SDRAM
- 10GB[1] Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- 3Com® Etherlink® 10/100 PCI NIC for Complete PC Management
- 16MB ATI RAGE 128 Pro 2X AGP Graphics Card
- 48X Max Variable CD-ROM Drive
- 15" Colour Monitor (13.7" v.i.s.)
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 2000
- Dell QuietKey Keyboard
- Microsoft® Intellimouse®
- Norton Anti-Virus 2000
- Telstra Big Pond Business ISP Offer
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- Integrated Direct AGP 4MB Dynamic Video Memory
- 48X Max Variable CD-ROM Drive
- 15" Colour Monitor (13.7" v.i.s.)
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 2000
- Dell QuietKey Keyboard
- Microsoft® Intellimouse®
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Dell Dimension™ T Series[8] photographed with options: 17" flat panel monitor and Altec Lansing ADA 880 speakers.

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DELL DIMENSION™ DESKTOPS

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- 128MB PC700 356MHz ECC RDRAM
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- 3.5" 1.44MB Diskette Drive
- 32MB NVIDIA geFORCE 4X AGP Graphics Card
- SoundBlaster Live! Value 576Voice Sound Card
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- Microsoft® OEM Works Suite 2000
- Norton Anti-Virus 2000
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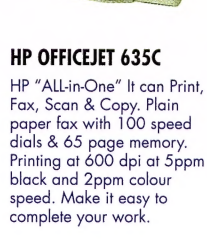
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- Intel® Pentium® III Processor 600EMHz
- Mini Tower Model
- 256KB Advance Transfer L2 Cache
- 64MB 100MHz SDRAM
- 10GB[1] Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- 32MB NVDIA TNT2 M64 2X AGP Graphics Card
- Turtle Beach Montego II 320 Voice PCI Sound Card
- 48X Max Variable CD-ROM Drive
- Harmon Kardon Stereo Speakers
- 17" Colour Monitor (15.9" v.i.s.)
- Microsoft® Windows® 98 Second Edition
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- Microsoft® Intellimouse®
- Norton Anti-Virus 2000
- Conexant™ V.90/56K PCI Telephony Modem for Windows
- Dell QuietKey Keyboard
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- PowerGame Pack II
- 3 Year Limited Warranty
- **Free Lifetime Telephone Technical Support[2]**

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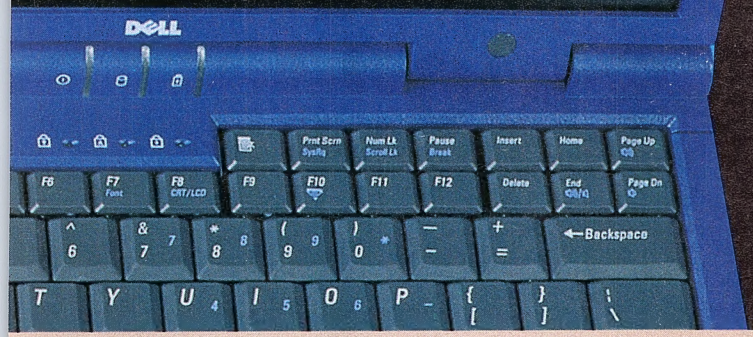
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- 8MB ATI RAGE Mobility™ -P 2X AGP Video Controller
- High-fidelity Audio SoundBlaster Compatible
- 24X Max Variable CD-ROM Drive
- 14.1" XGA Colour TFT Display
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 99
- Deluxe Carrying Case
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- 64MB 100MHz SDRAM
- 6.0GB[1] Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- 3Com® 10/100 LAN CardBus PC Card
- 8MB ATI Mobility M1™ 2X AGP Video Controller
- High-fidelity Audio SoundBlaster Compatible
- 24X Max Variable CD-ROM Drive
- 14.1" XGA Colour TFT Diplay
- Microsoft® Windows® 98 Second Edition
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- Deluxe Carrying Case
- 1 Year Limited Warranty (With International Coverage)[3]
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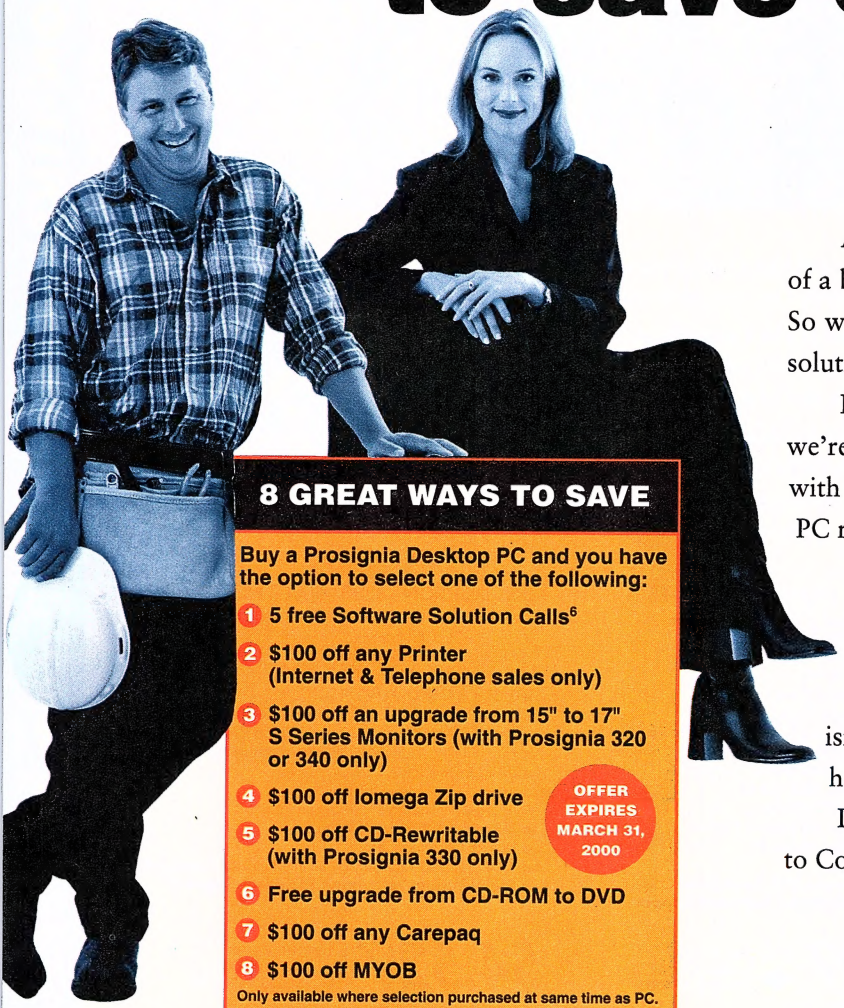
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40X CD-ROM Drive[1]
Creative SoundBlaster AudioPCI 128V
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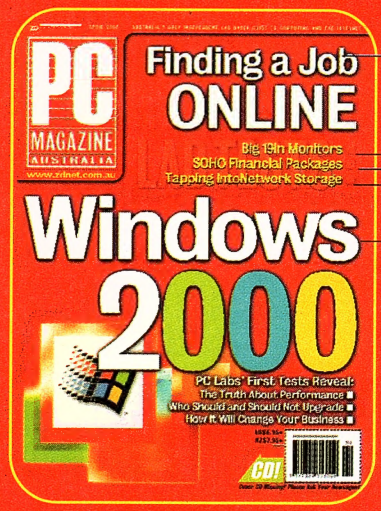
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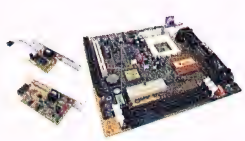
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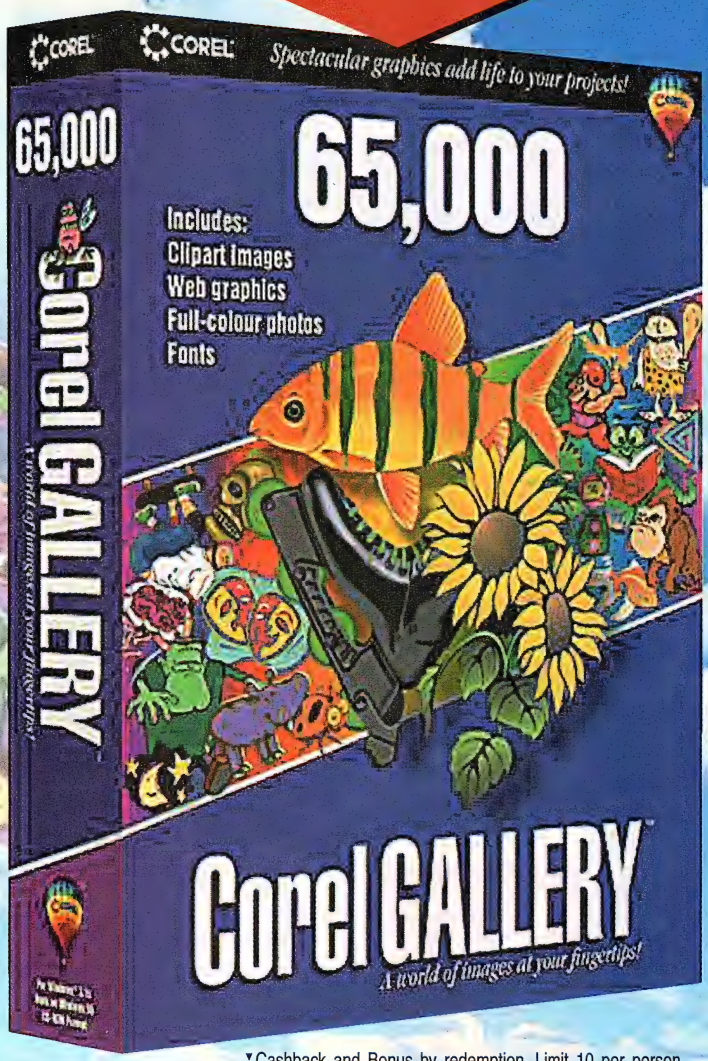
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Whistle While You Surf

One of the great paradoxes about people and their money is that the more they are prepared to spend, the less they seem to spend on preparation. I have an engineer friend who, when shopping for a water pitcher with his wife, spent two hours in the store actually *testing* different products because he didn't want one that dribbled down the side after each pour. (In the end, he couldn't find one that measured up and he went home empty handed.) I know people who have spent less time test driving a car they were thinking of buying. And what do people do when faced with one of the biggest purchases of our lives: a house or apartment? We spend a couple of hours visiting the place at a time specified by the real estate agent (*gee, these rooms get a lot of sun . . .*), and maybe have an "expert" come out and tap on a few walls and tiles. Then it's off to the auction where the deed is done (so to speak) in a matter of minutes. Really, for the kind of investment involved, don't you think prospective buyers should be able to at least have a few sleepovers at the place?

Now online: get out of that ***dead-end job*** *and into an* ***Internet*** *startup just in time for the industry* ***shakeout.***

Obviously, the best way to get a good deal on a home purchase is to do your homework—check out the local property guides, visit places on the market, pester real estate agents for more information (turnabout's only *fair*, don't you think?). The people I know who've done best in real estate have done all this and more prior to buying; you can open the paper and find something that you *might* like, but you have to visit quite a few before you'll find something your *sure* to like. It's simply a process of becoming familiar with all the tricks of the trade and discovering for yourself what is really important.

And all this applies to that other crucial decision in life: finding a job. In this case, however, the computer-equipped jobseeker has a distinct advantage. The online job sites we look at in this month's feature, "Finding That Job Online", provide more information for those on the prowl than has ever been offered in the history of job hopping. The sites are much more than listings; they offer training on how to impress at that interview, tips on making your resume look like something a prospective employer might want to actually read, and they introduce you to courses designed to give you the knowledge that will help you get out of that dead-end job and into that Internet startup just in time for the industry shakeout.



Even if you don't actually *find* a job using one of these sites, you'd be silly not to use the wealth of info they provide. Just as we were going to press, for example, IT jobs site JobNet launched a new service called Jobstats: pages of charts and graphs that not only tell you how many new jobs have been added each day, but that show you where those jobs are and the trends in specific skills and fields. Job trends can also be viewed for other criteria such as which vendors are offering the jobs and the geographical location of the positions.

Now, there's simply no excuse for not being happy where you work. Of course, if you just *enjoy* being miserable, you'll probably find it much more fulfilling to turn your browser to the cheerily named *mylastwish.com*. This indispensable online service lets you store secret files (a will, journals, or those compromising videos, for example) for delivery to lucky "beneficiaries" after you've kicked the bucket. Kind of a long way to go to get the last word in on that flame war, isn't it?

Brian Haverty

Check out all of our columnists' news and views on ZDNet Australia at **www.zdnet.com.au/opinions**

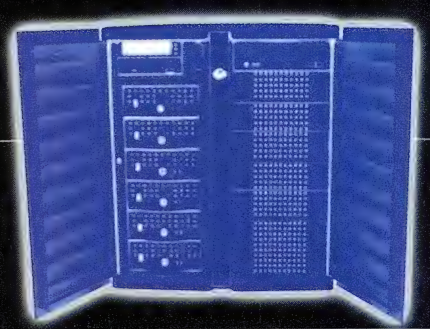
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We've got mail!

REEL TO REAL

Do you have anything on video transfer? I wish to transfer reels of VHS to CD. And I'd like to know what products would be best to do the job. Will you be doing tests on DVD movie cameras? I bought a Canon 350 as a result of your magazine tests.

COLIN WAGENER
VIA THE INTERNET

The only items we have tested are video capture cards that allow the user to capture to a fast (and large) hard drive in either MPEG 2 or a proprietary format. You must then transfer the resulting file to CD, but you may need to convert the file to a different format in some cases. I do not know what level of quality you desire in the final product but to our mind a good starting point would be a Matrox G400 Marvel. Then to get better quality and hardware MPEG 2 encoding, other more expensive options would be required.

We will be testing Digital Video Cameras in the May issue of PC Mag.

—Steve Turvey
Lab Manager, RMIT PC Test Lab

MERRY CHRISTMAS

I recently went e-shopping for software. It's turned out to be an experience that can only be described as Good, Bad, and Badder News.

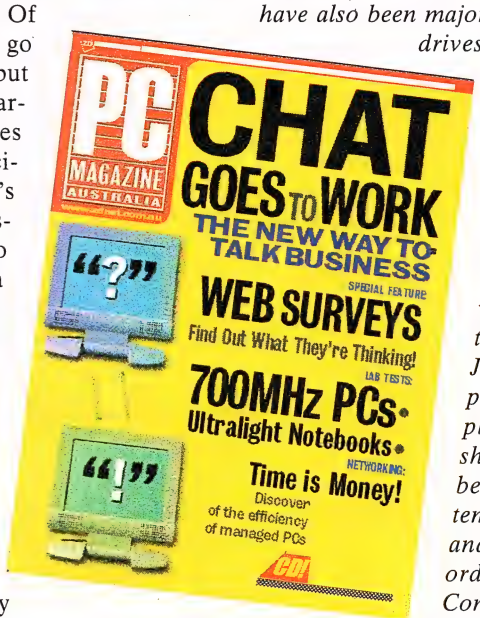
The Good News? It's now all arrived, at an initial purchase price that was an attractive discount to retail prices. The Bad News? It was ordered in November, for seasonal gifts (from an Australian site). The Badder News? Each item was shipped individually in its own shipping container, and my credit card was charged each time. Goodbye discount. Goodbye good buy!

JONATHAN HIGBED
VIA THE INTERNET

PC FUTURES

In the March 2000 edition of *PC Magazine Australia* you ran an article on 700+MHz PCs (page 82). I have a concern about the availability of the E@PC machine included in the review. Most of the other PCs are available here today, but your Editors' Choice-winning PC with its bargain price does not even seem to exist.

I have been to E@PC's Hawthorn store and they told me that the advertised PCs won't be available for another few months, maybe more, depending on whether they can get the required parts. How can you advertise products that aren't available? Of course prices will go down in future, but here you are comparing today's prices with future anticipated prices. It's plain false advertising for E@PC to claim they have a 700MHz system like this available at $2799 or $3199. They wouldn't even accept my order at the time but they were more than willing to offer me one of the 533MHz PCs they had in the back of the store at prices in excess of $3380.



Explain to me how you can justify this promotion of a bargain PC.

DAVID SVILANS
VIA THE INTERNET

Response from the supplier:
Firstly David ordered a 533MHz machine on the 22nd of February, 2000. . . this was obviously ordered before your magazine went out to the newsagencies. The computer was a custom-built system, and David paid a $385 deposit upon ordering it. When the magazine article appeared, David wanted to cancel that order and have the Full Throttle Extreme Pro instead. We offered to accept that order; however, because he was cancelling another order for a system that had already been built and was ready to collect, we advised that there would be a cancellation fee. David would not accept this, and cancelled all orders.

In terms of the availability of the machine and orders we are taking, there have been major shortages of all Intel-based CPUs. You can call Intel direct and confirm this fact. Furthermore, there have also been major shortages in DVD drives, and we hope things will be back to normal by the end of March.

We could not possibly have foreseen such a horrendous supply situation when we submitted the machine in early January. We anticipate that when supplies normalise, we should be able to begin shipping systems within weeks, and are accepting orders on this basis. Considering most computer companies would have a 2-3 week turnaround period from the point of order the delay due to the current circumstances can not be considered unreasonable on our part.

—Danny Jovica
Director, E@PC

From PC Magazine Australia*:*
As a test (we had several other readers bring this situation to our attention), we had a staff member pose as a customer and attempt to order a non-discounted 700MHz system. We were given the same story, so we'd have to say we think the

HOW TO CONTACT US

We welcome your comments and suggestions. Please send Letters to the Editor via

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PO Box 1287, North Sydney NSW 2059

All letters become the property of PC Magazine Australia *and are subject to editing. We regret that we cannot answer letters individually.*

excuse is valid.
—Editor

NO SPEED DEMON

I enjoyed reading your articles in the March 2000 issue of *PC Magazine Australia*. I'm not sure, however, that I can accept your comments on the Celeron 333 (page 21). This chip has been a big disappointment to me, although maybe I am doing something wrong.

I run Quick Basic programs which are entirely mathematical in nature. I have benchmarked them on my P100, a borrowed P200, and on my Celeron 333A.

While the P200 runs twice as fast as the P100, the Celeron 333 only manages a performance increase factor of 2.2. As I had expected a factor of 3.4, this was very disappointing.

The Celeron has all the advantages: AOpen AX6BC MB, 128MB PC100 RAM, etc. I have tried the BIOS settings of 68.5 CPU clock frequency and clock ratio of 5, and 100MHz and ratio of 3. If I overclock, I lose the system from time to time.

While the Celeron has a good price, next time I will go for the Pentium.

STUART L. SHERLOCK
VIA THE INTERNET

We've done quite a bit of work with the Celeron processor and have always achieved much better results than those you describe, so we'd have to say that something is definitely holding your processor back. Without a more detailed description of your system's configuration and settings, however, it would be difficult for us to pinpoint the problem.
—Steven Turvey
RMIT PC TEST LAB

POUND FOR POUND

In the February issue of *PC Magazine Australia*, page 149, was a tip to include a symbol for the British pound in an Excel spreadsheet.

"Each item was shipped in its own container and my credit card was charged each time. Goodbye discount. Goodbye good buy!"

I used the suggested #$ in the Replace field but I could not enter the symbol nor the equivalent ALT+0163 code in the With field.

Can you tell me how to enter the required symbol in the With field.

PETER COSGROVE
VIA THE INTERNET

The quickest way (because you only have to do it once) is to copy the character from Word and paste it into the With field. The other alternative is to install one of the many free Character Map utilities available on the Web. These give you quick access to special characters, whatever application you happen to be in.
—Editor

TIP FOR FILETIP

On page 153 of the March issue of *PC Magazine Australia* you ran an article by Patrick Philippot on a utility called FileTip. The article intrigued me, so much so that I thought *I gotta try this*. On to the Net, I followed the instructions to *www.zdnet.com.au* and— darn!—all the instructions led nowhere. I couldn't find the article at the Web site and when I do a search for the download the search engine gives me everything else but the program I am looking for.

JOHN TAYLOR
VIA THE INTERNET

I had a quick look at the site and did a search for FileTip from the Downloads section and came up with the goods right off. The full URL for FileTip is http://www.zdnet.com.au/swlib/Utilities/File_Utilities/0014SW.html
—Editor

Correction

A last-minute production glitch caused some text flow problems on the last few pages of last month's subnotebook review. We've created corrected .pdf versions for those pages and would be happy to e-mail them to anyone who sends a request to pcmag@zdapn.com.au.

Letters Competition

brought to you by Harvey Norman

We had a tough job coming up with a winner for this month's We've Got Mail Competition. Normally, sob stories wouldn't do it for us, but given the subjects of this month's entries, we felt it our duty to try to cheer people up with the prize. But who? Should we give the nod to David Svilans to help him get over his PC purchase problems? Or to Stuart Sherlock so he'd be able to call friends so they could commiserate about his slower-than-average Celeron?

In the end, our hearts went out to Jonathan Higbed. We've always had pretty good experiences shopping on the Web, and to hear about all his trouble with last year's holiday purchases just didn't seem fair. So for his troubles, Jonathan will receive a **KX-TCC116ALW Multifunction Cordless Phone** from Panasonic, provided by Harvey Norman (the phone has a retail value of $249).

We are also planning a year-end competition where we'll choose the Letter of the Year (and offer a big prize from HN to go along with it).

Congratulations Jonathan! And the rest of you: keep those e-mails and letters coming!



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Details and proud photos on web at www.liebert.com

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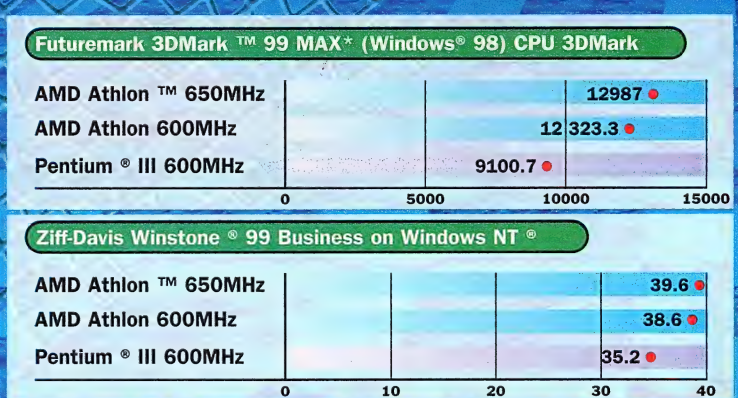
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Internet Free-For-All

I've sacked my ISP.

I e-mailed them yesterday and very kindly told them that their services were no longer required. This might seem an incredible statement coming from someone whose life revolves around the Internet, but it's true. I was tired of hearing an engaged signal when I tried to connect—despite the promise of a "better than 8:1" modem ratio. And most of all, I was sick of paying $30 per month for an "unlimited surfing" package that cost me up to $10 extra when I exceeded my 300MB download limit.

In the future everyone with a PC will be accessing the Internet for Free.

So I sacked them.

Before you worry that I've gone to live in a cave, let me assure you that I am still online. In fact, I spend more time online than ever.

Outside of business hours, I surf about two to three hours per day. The difference is that now, I'm doing it for free.

If you watch TV or listen to the radio, chances are you've seen deals for free Internet access advertised: you sign up to a provider that offers the same type of services as your current ISP, but you don't hand them a red cent. How do they do it? Well, instead of charging their customers for accessing the Internet, free ISPs make money through online ads displayed while you surf, and by selling your statistics to third parties.

Some may baulk at the thought of trading their personal information for Internet access, after all, everyone enjoys their privacy. But the concept of exchanging personal information for discounts and freebies is not a new one. Consider the popularity of schemes such as Fly Buys and other customer loyalty programs—most people have no problems with these, and yet they fear that information disclosed online will be used to suck their bank accounts dry!

The free ISPs I've checked out are also very up front about what information they disclose and what is kept confidential.

FreeISP, for example, says that they do not provide any customer's personal information to third parties, that is, they don't give out info such as customer names and contact details. What they do disclose is general demographic information—for example, the percentage of male users, married users, and users who make over $50,000 per annum. This information doesn't identify users, and it certainly doesn't bother me!



As a member of Free.net.au my job is easy. In return for free access, it becomes my duty to put up with a banner ad that sits silently on the top corner of my monitor. The ad doesn't bother me at all, in fact I hardly even notice it—um, well, maybe I'm just taking it all in subconsciously.

In the future, I predict that everyone with a PC will be accessing the Internet for free. Deals from online stores, banks and other businesses with an interest in dealing with customers online will see to that.

Online stores need us more than we need them—after all, dealing with customers online is much cheaper for such organisations than running bricks and mortar establishments. We are moving into an era where money spent to access the Net is negligible. It's the money spent by users once they're online that businesses will be clamouring to get a slice of. If the cost of dealing with customers online is to subsidise Web access, so be it.

So surf free—let someone else pick up the tab! PC

Anna Raciti

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Thunderbirds Are Go

AMD, which is shrinking its manufacturing process to 0.18-micron, will follow the Intel Coppermine design with a new chip and put a 256KB L2 cache on the chip's die. This new higher-performance processor is code-named Thunderbird and will probably be sold at gigahertz speed. A low-end version for you kit builders will be released to compete with Intel's cheaper chips. These new processors will be released in a socket version. I get the biggest kick out of these companies going from socket to slot to socket after all the nonsense about how sockets are no good for high-speed chips. Now they are good again. Get a grip. Anyway, both AMD and Intel are expected to roll out chips in the Thunderbird/Coppermine family with extra-large L2 caches (more than a megabyte). The code name for the fat-cache AMD chip is Mustang; for the Intel part, Cascade.

Meanwhile, the Sledgehammer, or K8 chip, is being chatted up by AMD observers. The Sledgehammer is a 64-bit part expected to compete with the Intel Itanium, but the Sledgehammer will run straight x86 instructions. You can look for it in the first quarter of 2001.

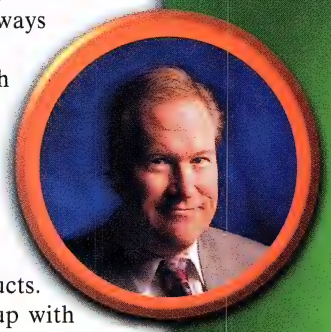
While AMD and Intel get all the attention when it comes to processors, you can't overlook the ARM chip, shipments of which, in 1999, reached 175 million! Apparently the chip has taken over the cell phone business, and ARM Ltd. hopes to get the chip into automotive and other applications. The ARM chip is a phenomenon, and I always wonder why a small PC device hasn't been wrapped around one. Linux, anyone?

The Big One Dept.: Sanyo has opened up a new LCD plant that will make a 26 x 34-inch LCD glass substrate. Such plates will be used mostly for 15in and smaller displays for notebooks. This process allows an individual panel to be made in any size up to the size of the glass substrate. A calculation is made as to the value of the various sizes and how many individual panels can be cut out of the giant piece. Marketing and mathematics determine how the chunk will be cut up. It's kind of like cutting cloth, and once done you can't go back. But I suspect that with a piece of substrate this big, at least a few monster panels will be made for trade shows and bragging rights.

What Are They Thinking? Dept.: Bill Gates allegedly remarked to a friend that he was stunned by how he could say something out of the blue and it would be picked up by the media and reported as gospel. People tend to be gullible, and apparently none are more so than the consumer-goods folks, who seem to have bought into the Internet appliance nonsense without compunction. At a recent Housewares 2000 show in the US, many appliance makers were showing (this is just too funny) Internet-ready electric blankets, as well as the Internet coffee maker that I always thought was a perverse joke.

Sunbeam is leading the way here with its new division called Thalia Products. Apparently the company has teamed up with Zilog and a software company to put networking capabilities into all sorts of things. The devices will be networked through the power lines, so the authorities can monitor your blanket and tell when you are in bed in order to sneak in and bludgeon you. Maybe I'm just suspicious. Whatever the case, I never thought I'd need a firewall for a blanket or a toaster!

At a recent Housewares 2000 show, many appliance makers were showing (this is just too funny) Internet-ready electric blankets.



Okay, Now It Gets Really Weird Dept.: According to Electronic Engineering Times, a team at Princeton University is carrying on work done using DNA strands to do computer calculations. All hopes for the never-ending progression in computer power seem to lie in our ability to transition from silicon-based computing to organic computing.

The research team utilised RNA to solve a problem with 1024 possible solutions. It got almost all of the solutions right, and just one wrong. The one wrong answer seems to be the most valuable discovery, since it somehow reveals the nature of an error that is important to these folks. Now if anyone can explain to me how to program strands of protein to do calculations, write me! PC

John C. Dvorak

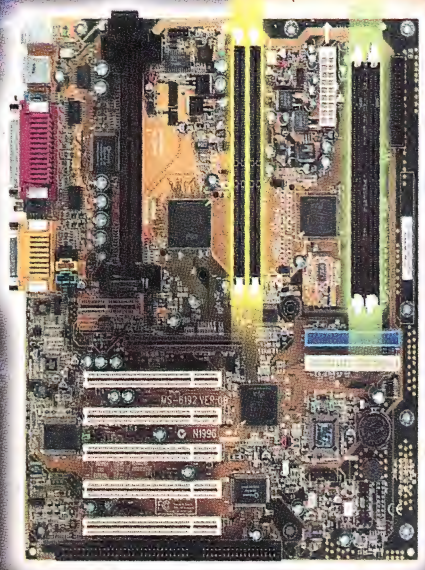
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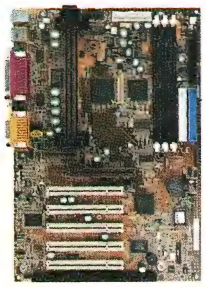
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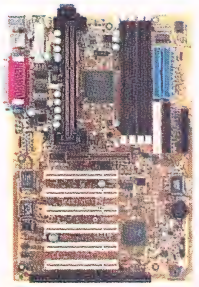
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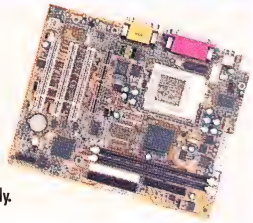
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Technology in the Woodwork

Funny how we sometimes look around to find that technologies that not so long ago seemed exotic have wormed their way into the woodwork of our everyday computer use. I've written about this before—as the phenomenon intrigues me—but it's worth revisiting, because it keeps happening. Just happened to me again yesterday, in fact.

This time, the technology was a CD-R recorder, which, at least in my office, has become about as exotic as e-mail or a coffee maker. Not so long ago, I saw CD-R recorders as gee-whizzy—something to be used with extra care and special attention for special purposes. The process was slow and iffy; like nearly everyone else in the early ranks of CD-R users, I made an awful lot of "coasters"—CD-R blanks reduced to useless Frisbees—because something went wrong in the recording process.

Getting used to technology is one thing. Noticing that it has changed your behaviour is quite another.

But I believe at least a year, probably two, has passed since the last time I turned out a coaster: the process is now so simple and reliable that today I'd be very surprised if I had a failure.

Changing file exchanging Getting used to technology is one thing. Noticing that it has changed your behaviour is quite another. And I have noticed that the ease and convenience—and sometimes, the speed—of knocking out a CD-R really has changed some of my work habits.

I almost never send someone a file or two or ten on a floppy disk, for example. In the case of ordinary-size files, I'm more likely to use e-mail rather than CD-Rs: hanging a few files off an e-mail cover note as attachments is so quick and easy that I do it all the time. You do, too, I know. Big deal, huh?

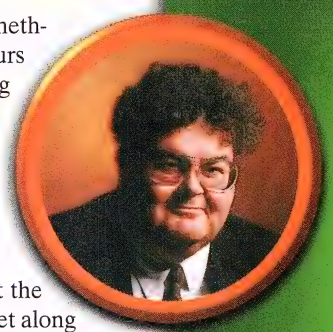
But what to do when the files are large? Maybe very large? Most e-mail systems gag on attachments larger than 600 or 700KB. I could use one of the store-and-forward services, such as Yahoo!'s Briefcase feature, or my favourite, click2send (*www.click2send.com*). But that involves several assumptions.

First, that I have a broadband connection, which lets me transfer 20MB, 30MB, 50MB files, maybe several of them (which I exchange with my corporate clients frequently), without too much pain. Second, that my client/addressee has a similarly fast connection, so the download process will be bearable. Third, that he or she is sufficiently unintimidated by the technology to handle logging on and grabbing the download. (Skeptical? You'd be surprised....)

What about using FTP? I use FTP for file transfers when my electronic correspondent is technically savvy, but frankly, too often that's not the case. Even with FTP Voyager or CuteFTP software or using LapLink FTP's software and site, FTPing files is often beyond the computer skills of my partner in an exchange.

Moreover—and this is key—neither of us wants to devote a lot of time on the phone to setting up the big transfer. If we're going to repeat this frequently and can take the time to automate the transfers, which is easy with FTP Voyager, then maybe—maybe.

Still, big file transfers via any of these methods too often lead to hours sending, hours receiving, and hours on the phone settling the details of the transfer and working out the kinks. When what we really want to do is get along with our business—the reason we had to ship the files back and forth in the first place.



CD-R to the rescue I can burn and ship a 650MB disk in less than 20 minutes, including setting up the copying routine with Adaptec's wonderful Easy CD Creator and filling out the FedEx waybill and pickup order online. Boom, I'm back to work. That fast. And I know the procedure is going to work. Next day my client gets the disk, pops it into a ubiquitous CD drive, and is working with the data.

Sure, that's a 24-hour turnaround for something that we might have been able to do in just a few hours working on the Net. But we have to ask ourselves, is the savings in time really worth putting up with the vagaries of file transfers across the Net?

Sometimes, yes. And then we do the transfer that way. But far more often, when file sizes get into the tens or hundreds of megabytes—and there may be several of these whoppers transferred at once—I rely on CD-Rs for their raw efficiency.

I use CD-Rs in lots of other ways, too, of course. More on that, and why I think CD-RWs are in many ways a nonissue, next time.

Jim Seymour

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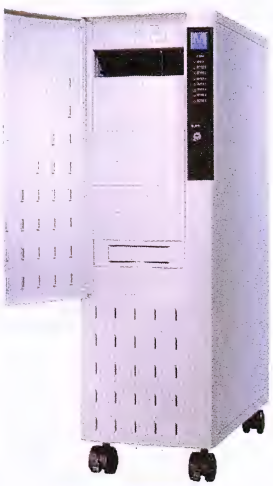
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File Server Series



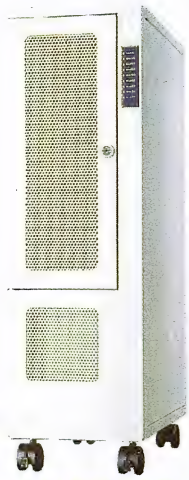
CSSV-950X

The Maxtron CSSV-950X and the CSSV-912X series are ideally suited to the high demands placed on File Servers today. Affordable and feature packed, they have been designed to ensure trouble free operation while providing security, reliability and upgradability.

Features Include:

- **Full Metal Construction (CSSV-912X)**
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- **Lockable Front Panel (Protects Power Switch & Devices)**
- **Extra 8cm Fan**
- **9/10 x 5.25" Drive Bays**
- **8 Device LEDs**
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- **Redundant Power Supply (Optional)**

Affordable Quality!



CSSV-912X

Rack Mount Equipment



Rack Mount Cabinets CSAB - 35U

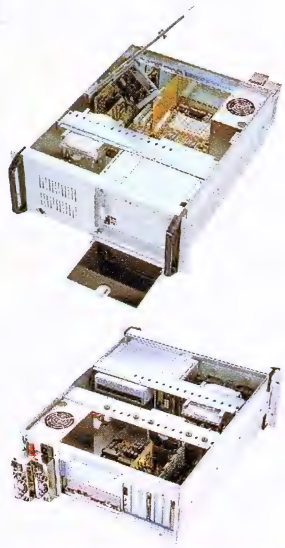
The 19" Rack-Mount Chassis is specifically engineered for brutal industrial environments and meets the EIA RS310C. Designed to isolate the computer from SHOCK, VIBRATION, HEAT, DUST AND MOISTURE. Allows installation of ATX / FULL / BABY / SERVER Motherboards.

The CAB series of Rack Mount Cabinets provide elegant, high cabinet enclosures for your 19" Rack Mount equipment. Three models are available: The CAB-15 has 15U of internal height (1U=44.45mm). The taller CAB-30 and CAB-35 have 30U and 35U respectively.

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- **Front and Rear Door with 5mm Acrylic Plate**
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- *Available in Black or Beige*
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Getting More Out of Internet Auctions

Don't limit yourself to stamps and kitchen appliances . . . buy a small business instead!

Think online auctions and you probably think of collectibles—rare books, sports memorabilia, and antique toys. But auction sites are evolving far beyond the buying and selling of goods that can be packed in a box and delivered to your doorstep. They're spreading out into more intangible territory, where intellectual property, professional services, and even entire businesses are bought and sold.

These days you can head to several sites to bid for professional services as well as commercial goods like printing and trucking services. With an eye to delivering professional services, Web entrepreneurs are setting up shop as technology talent auctioneers.

Likened to an eBay for intellectual capital, newcomer HelloBrain.com promises to connect technology pros with companies looking to outsource their IT work. Need an algorithm for real-time audio compression? Post the fee and a description of the problem. Wait for a "contributor" to accept an offer, figure out a solution, and e-mail you the answer. Technology professionals can also post their ideas and areas of expertise, aiming to attract companies in need.

Suppose a company wants to create a Web site and is in search of artists, animators, programmers, and database experts. A company can visit HelloBrain.com and ask for a virtual team to bid for the job, or it can separate the project into various subtasks.

HelloBrain.com provides tools for online collaboration, evaluation, verification, delivery, and security. CEO Bharat Sastri expects to deal with a wide range of technology problems and solutions, including everything from software to chip designs.

Other sites offering similar services include Collab.Net, eLance, Guru.com, Monster.com's Monster Talent Market, Niku, Opus360, and WorkExchange.com. Going a step further than these online service marketplaces, eBay's German operation, eBay.de, recently sold an entire company to an online buyer.

INTELLECTUAL EXCHANGES

At these online marketplaces, employers can post project proposals and free agents can bid on contracts.



Collab.Net www.collab.net
eBay www.ebay.de
eLance www.elance.com
Guru.com www.guru.com
HelloBrain.com www.hellobrain.com
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Opus360 www.opus360.com
WorkExchange.com www.workexchange.com

INTERNET

Speedy Sales

Sure, we'd all love to be Internet savvy and do lots of shopping online, but many people forgo Internet shopping because in most cases, it's still quicker to pop down to the local shops. Although some Web stores are offering overnight delivery in order to win business, even overnight delivery is too long a wait for some consumers.

In the US, where online shopping has taken off with a bang, a few innovative companies have begun offering same day—even same hour deliveries. How do they do it? Well-stocked local warehouses and huge teams of bicycle couriers.

One company, Kozmo.com has targeted the cities of Boston, New York, San Francisco, and Seattle and has begun delivering books, video rentals and purchases, music, games, and even doughnuts in minutes. Another company called Urbanfetch.com, which caters to the New York market is open for business (and deliveries) 24 hours a day!

In Australia, there are services that come close to instant deliveries. Cuisine Courier, a company that delivers restaurant meals to customers in Sydney and Melbourne deliver around one hour after an order has been placed online. But there's still a long way to go.

Sydney-based online DVD store OzDVD Warehouse began guaranteeing same day delivery for customers who placed orders online before 9.00am. Unfortunately, though the service is still available, the site cannot guarantee same day delivery. Anthony Sereni, Online Manager of the site believes fast deliveries are key to the success of online businesses, but says many courier companies have been unable to keep up with demand. "They can't promise us that our customers will get their orders the same day," said Sereni. "This presents a problem for online shopping because once people have decided to buy something, they like to get it quickly."

—Anna Raciti

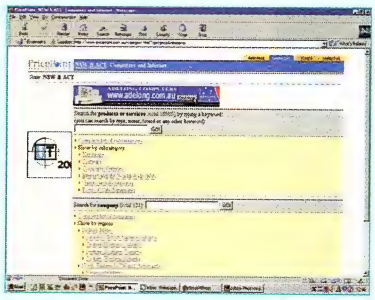
INTERNET

The Price is Right

Though you might have warmed to the idea of buying products online, you're probably already sick of visiting multiple Web sites in search of the best price for a particular item. To save you the trouble next time you're bargain hunting, PricePoint.com.au has done the hard work for you.

This Web site allows visitors to check prices on goods from various retailers free of charge. The site lists product prices for Web *and* brick and mortar stores, so you don't need to visit a retailers Web site or call them to check a price.

The site charges retailers a fee for listing their prices, but at the same time, the site provides a space on the Web for stores that have no other online presence.



Currently users can only search for prices of IT products, but PricePoint's categories are due to expand—look out for consumer and telecommunications products such as phones and fridges. —*Anna Raciti*

Web Popularity Club

At AltaVista last year, over 90 percent of the top 20 search terms were entertainment-related. A Jupiter Communications survey reports that 42 percent of consumers spend less time watching TV because of time spent online. Here are AltaVista most frequent entertainment search requests of 1999.





















INTERNET

Car Courage

Have you ever wanted to ask out the person in the car next to you at the lights? The Internet is making it possible. Fantastic Corporation, based in Australia (02 9957 4899; www.fantastic.com) is currently developing new technology to enable mobile multimedia communication. But how does that help those looking for a date?

The Multimedia Car Platform (MCP), by Fantastic is set to provide the Internet in vehicles! Together with sponsors such as BMW, Deutsche Telekom, Sun Microsystems and Singapore TV, Fantastic's technology is the front runner for adoption as the European standard for broadband multimedia data broadcasting.

The goal will be to provide a steady and uninterrupted Internet service to vehicles by using the latest audio and video standards (DAB, DVB) and the latest mobile phone standards (GSM, UNTS, 3G). The Internet access will be controlled via voice commands from the driver and manual controls for passengers.

Children can then watch cartoons or play games in the car and drivers can find out about the weather, traffic and news reports.



The service is also planned to appear on trains, planes, PDAs and mobiles.

Since it is an Internet service, e-mailing facilities will also be available—so you can ask that cute driver on a date—perhaps we should all have e-mail addresses on our bumperstickers? —*Helena Keers*

A New Spin on Washing

Life would be a whole lot easier with a Merloni Margherita 2000 washing machine from Italy's Merloni Elettrodomestici. This smart appliance can download new washing programs from www.margherita2000.com and report faults to a service centre. Another convenience: you can turn it on and off via your mobile phone or the Internet.



And the winner is...

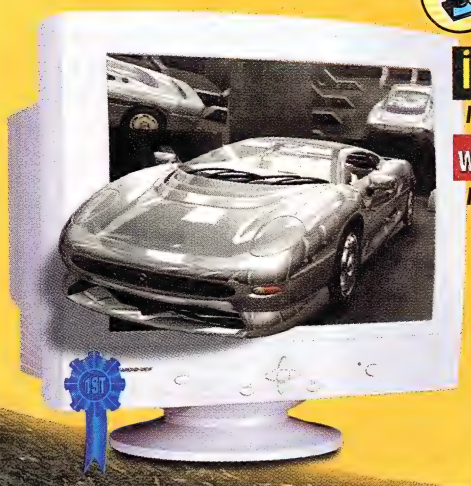
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Editor's Choice apcmag April '99

iTgraphics 1999 Awards

Windows 2000 1999 Awards



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18.1" Colour TFT Monitor



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Editor's Choice apcmag April '99

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MY DESKTOP

Ms MegaByte

Outrageous IT personality you can tune into on TV (Good Morning Australia); on radio (3AW and 2UE;)and in the Woman's Day.



What type of PC do you own? A Sony Vaio sub-notebook P266, 96MB RAM, 4GB HD drive.

When did you first start using a computer? At home in the mid 80s on a Commodore 64.

What program/application do you use most on your computer? E-mail—Microsoft Outlook 2000

What do you hate about your computer? It's from overseas, so I can't get tech support here.

What do you love about your computer? It's tiny, with lots of memory and disk space, and it's *silver*!

What PC device do you hanker after? The latest, greatest digital camera.

What's the most useful site on the Net? www.msmegabyte.com.au—Australia's first computer learning site!

What is the strangest site you've ever come across? www.kissthisguy.com—the archive of misheard song lyrics.

Have you ever bought anything online? Groceries and software—all my essentials.

What's your browser home page? www.dummies.com.

How has the Internet affected your life? It's made my life more *instant*—just the way I like it.

Have you ever introduced yourself to people in a chatroom? Yes.

Have they ever believed you? Yes—eventually!

Does having cyber sex constitute cheating on your partner? Yes, mental, physical, spiritual—if you're not getting it at home, call it a day!

What's your favourite computer game? Frogger! Old style, a table-top, two player game with those little crazy stools.

In a word, what would life be like without computers? Scary!

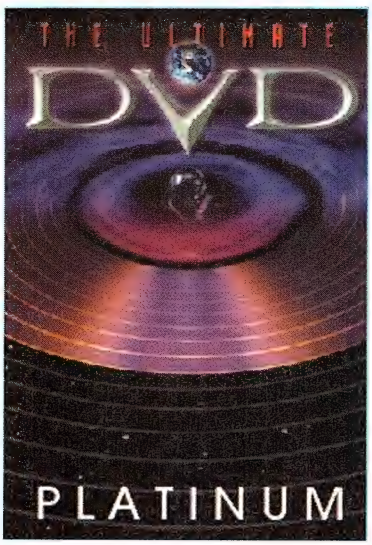
DVD

DVD Goes Platinum

Attention all DVD fans (especially those with a home theatre setup). Ultimate Platinum DVD is a two-DVD set that combines just about every DVD and home theatre show-off and set-up utility you could imagine. The product is hot off the presses, production having been delayed for many months.

The disk has a range of calibration and phasing routines that show you what speakers are being tested while putting audio through them. You get to choose from the different audio encoding systems such as Dolby Prologic, Dolby Digital 5.1, DTS and PCM. The same goes for the various demo video clips, which are available in the different audio standards so you can compare (if your system can handle them). There's even some 96k / 24bit audio. Using the settings we found that the left and right channels in our test system were about 10dB too soft compared to the centre and rear channels.

The video and audio clips include various Imax shorts and music from Alan Parsons, Mickey Hart, Scott Rockenfield and Tangerine dream. Even the still pictures are absolutely stunning.



There's a selection of controlled car crash clips so you can try the multi-camera-angle feature (seven angles). You can switch between multiple aspect ratios (from full-screen to widescreen, anamorphic and letterbox) and there are clips that have eight different language soundtracks.

Other demos include parental lock, fancy menus, animated menus, video icons and so on. In other words, all the things that your DVD player handbook says the player can do, but you've never seen because most DVDs don't really take advantage of the format.

It's hard to believe that it's just your plain old TV set you're watching—this is most certainly the DVD you'll bring out to impress visitors.

One note though: the disk is in NTSC format, not PAL. That's only a problem if you're trying to watch it with an old TV. More modern sets should handle NTSC, as will your DVD player. If you're watching it on your PC from the DVD drive you'll have no trouble.

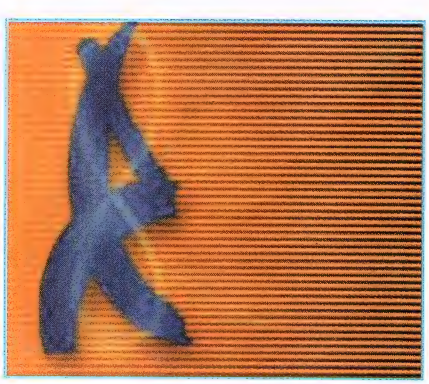
Amazingly, this DVD is cheaper in Australia than it is in the US, it's $29.95 from www.ezydvd.com.au. Delivery is $1.50 or free if you order another DVD at the same time. —*Paul Zucker*

INTERNET

Corporate Control

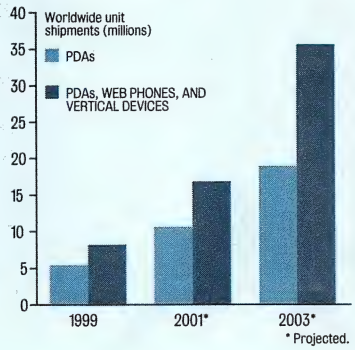
Whitewolf (02 9936 5500; www.whitewolf.com.au) has recently designed WebsiteMAX, a package for designing corporate websites. It is a 100 percent pure Java e-publishing platform that allows you to create sites without HTML skills. To assist beginners, WebsiteMAX makes use of templates—so you can publish material in a specified format for consistency and cost reductions. Making the task easier still is the use of a simple Windows Explorer-style interface.

The software can interface with database applications such as Sybase, Informix, Oracle and other database sources. Users can also run the software on any web server that supports servlets including popular—Apache servers, Sun, or Windows NT Information Server. —*Helena Keers*



Thumbs-Up for HandHelds

Palm devices continue to dominate the PDA market, which research firm IDC expects will soar to almost 19 million shipments in 2003. Sales of Web-enabled mobile phones were almost 40 percent under the forecast last year, but shipments are expected to increase to 12.9 million units in 2003.



GADGETS

The Power of Speech

Have you ever sat in a lecture or in a meeting and taped the conversation so that you could listen to it again later without missing any details? Sanyo's new handheld digital voice recorder does away with the hassle of having to go back over and transcribe your recordings. The Sanyo Digital Voice Recorder, the ICR-B100 (02 9417 7666; www.sanyo.com), has been produced by Sanyo Office Machines to record digitally in the popular Windows-based voice file format (WAV).

What makes this digital recorder different to analogue recorders are special features such as voice translation: you can not only e-mail voice messages to others, but also either transcribe the message (with the PC Memo Scriber) or convert the words to text via IBM ViaVoice.

You have the option of recording 128 minutes of sound per smart media card, or using the optional PC card for hours worth of recording.

The unit's features include voice activation, three way recording functions, a time and date stamp and an edit mode. You'll also find the unit features advanced dot matrix graphics display, a dictation mode, conference and lecture recording modes. Special background noise-suppression technology, also eliminates the frustrating backgroud static that most analogue units produce.

The package comes with software, interface and USB cable for under $1000. *—Helena Keers*



INTERNET

Back-in-Print Books

Out-of-print books may soon be a thing of the past. Online bookstore Barnes & Noble (www.bn.com) has teamed up with IBM to provide print-on-demand facilities. As a result, more books will be available quicker than ever. The concept is spreading also to bricks and mortar Barnes & Noble bookstores throughout the US, and may one day be a regular service available in most bookstores.

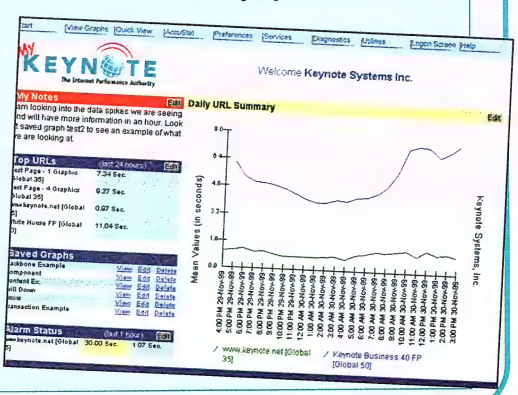
Printing a single copy of a book should take less than five minutes.

The technology for this type of printing has been available for quite some time, but the print quality has only recently caught up with high-speed digital printing techniques. In 1997, IBM formed a service called Lightning Print, which stores books in a digital library and prints each book one at a time, as ordered by retailers. This Barnes & Noble deal with IBM signifies the first time such a service will be available to the mainstream.



ONLINE UTILITIES

Curious about the performance of your Web site? That extra second you keep a customer waiting may lose you a sale. One way to find out how you're doing is with MyKeynote, a Web-based service that measures the performance and availability of e-business Web sites. MyKeynote also generates and displays information and graphs to help Web administrators identify problems. You can try it for free at www.mykeynote .com.





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If you're paying anything for your current Internet service provider, then it's too much. With GoConnect there are no joining fees, monthly bills, time limits or restrictions. You don't even have

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What you should show your current ISP.

to give us your credit card details. With GoConnect endless free Internet time does exist. So register now at **www.goconnect.com.au** or call **1300 368 368**

GO ON....CONNECT!

MONITORS

New Flat Panels

The price of LCD panels is dropping, but the displays still cost more than traditional monitors. One reason is the slow, expensive manufacturing process. LCD panels use fragile and expensive thin glass with a silicon coating on which transistors are created. The entire panel must be processed before defective transistors can be identified.

Now, a company called Alien Technology has developed a manufacturing method called Fluidic Self-Assembly (FSA) that efficiently produces transistors and then places them only where they're needed in the display.

FSA begins by making millions of transistors on standard cmos chips and carving them into tiny nanoblocks. The blocks are suspended in a liquid, which is poured over a surface with nanoblock-shaped holes. The blocks fit in the holes, and any excess blocks are recovered and reused. The technology works with glass and plastic panels.

SOFTWARE

In Sync with your Travels

Lonely Planet's (www.lonelyplanet.com; 03 9819 1877) audience has never been so high brow! Gone are the days of the impoverished traveller, dependent on a well worn, tattered copy of Lonely Planet—the travelling bible. Now we have the Lonely Planet Travel Guides in electronic format.

Lonely Planet Publications and Concept Kitchen have paired up to produce the first stand-alone travel guide specifically for handheld platforms. CitySync works with Palm III, Palm V, and upcoming Palm VII organiser. There is a guide per city and all the information you need is organised into simple intuitive categories. There is an extensive search option where you can look among hundreds of restaurants, hotels and attractions by location, price and more. Each in-depth review provides contact information, and ways to get there.

Unique to CitySync are scrollable maps integrated within the text. Each site highlighted within the text is identified on street-level maps, so users always know where they are and where they're going. Users can scroll around Neighbourhood Maps by dragging their stylus across the screen. There are also City Maps that give an overview of the city and identify the individually mapped neighbourhoods.

CitySync also lets you keep your own travel notes, so you won't forget the highlights. And with Palm's built-in infrared beaming feature, you can beam your exported travel notes to friends, family or business associates. You can download a free 48 hour trial version from www.citysync.com. You can download the program from the site for US$19.99 or buy the retail version for an estimated retail price of $70.

Travellers on a tight budget may find the program cost effective considering it covers your choice of 12 cities—but the Palm unit itself, sells seperately for between about $300 and $800. —*Helena Keers*

LAUNCH PAD

Logitech (www.logitech.com; 02 9972 3711) has released the Cordless Desktop Pro, a wireless keyboard and mouse set. The keyboard is made for ease of use with a split key layout, detachable palm rest. The mouse is shaped to fit the hand, and is made comfortable with the use of soft touch material. The Desktop Pro is priced at $249.



Brother (www.brother.com. au, 02 9887 4344) has just launched two new fax machines. The $519 **1020 Plus** plain paper fax has a 14.4kbps high speed modem, a 20-page automatic feeder, 200 sheet capacity paper tray and the potential for 60 automatic dial numbers, among other functions. The $1499 **MFC-9100C** is the world's first colour flatbed Multi-Function Centre with plain paper fax. Its six functions include, printing, scanning, copying, faxing, in colour and plain and video printing and capturing.



Dick Smith (www.dse. com.au; 1300 366 644) has recently introduced a fast and powerful computer package sold without a monitor, so you don't have to buy a new one if you don't need one. The $898 **DSX** package includes keyboard, mini tower CPU and a mouse. This multimedia capable system comes with a 333 Cyrix Processor, 64MB RAM, an 8.4 GB hard drive and a 16-bit sound card. The DSX package also has a 56k Austel approved modem to allow users to connect to the Internet from home.



InterNet Profit.com.au is a software tool from Manaccom (07 3870 4900; www.manac.com .au) giving comprehensive instructions on how businesses can make money on the Internet. The tutorial resource runs on any Multimedia PC, with Windows 95/98, 256-colour or better display and requires a Windows-compatible sound card and a CD-ROM drive. It's priced at $49.95.

Create your own custom CDs with Greenwich Mean Time's $39.95 **JBOX** (02 9452 6811, www.thejbox.net). The program lets you copy up to 1000 CDs to your hard drive in MP3 format. You can also download music from the Internet to store on your hard drive. Once you have built up your collection, the software lets you choose genres to listen to, select random songs or save playlists.

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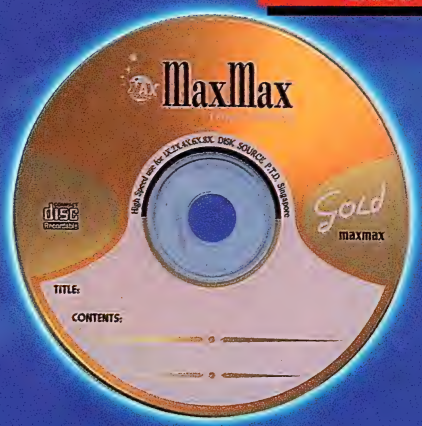
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Lab Notes

We are certainly living in interesting times with some of our perennial icons experiencing very stiff competition. The MHz war between Intel and AMD has shifted into high gear with both companies demonstrating "air cooled" silicon running in excess of the magical 1GHz. Yet another IT prediction from industry pundits rings true for 2000. Intel apparently demonstrated a 1.5GHz processor recently but its ilk certainly will not see the light of day this year. However AMD's 1.1GHz Athlon, which has also been viewed by the press, is slated for a fourth quarter release and it's a fairly safe bet that Intel will be pushing hard to launch similar offerings in the same timeframe.

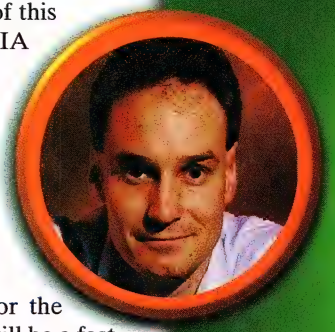
VIA's new Apollo Pro 133 chipset features a 133MHz memory bus for PC133 SDRAM

The rumours that Intel is in serious trouble because they underestimated AMD's Athlon seem to be a bit overblown—some have even gone so far as to predict Intel's downfall. No one doubts that Intel has been taken a bit by surprise and is rejigging its strategies but their latest CPU roadmap does not look too shabby (providing of course they deliver on their promises). The biggest problem Intel has at the moment is its supply of CPUs, and not just the high-end product either. The demand for CPUs in the first couple of months of 2000 has been quite steep and all vendors have experienced supply problems. Intel however, is quite confident that their position will improve during March and supply and demand will not be nearly so far out of kilter.

To make matters just that little bit worse its not just on the microprocessor front that Intel is skirmishing. For as long as we at the Lab can remember, Intel was king of the x86 chipsets. They have traditionally been the first out, not hard when you design the processor and set the standards perhaps, and more importantly the fastest. Historically, companies like VIA have produced some pretty impressive competition to Intel's products but while they are a less expensive solution for motherboard manufacturers and appear quite reliable, they are nevertheless just that bit slower.

It now looks like the tables have been turned. VIA's new Apollo Pro 133 chipset features a 133MHz memory bus for PC133 SDRAM and in preliminary tests conducted by others on the Web appears to leave comparable competition in the dust. Intels new 820 chipset was designed for RDRAM, the modules of which are still horrendously expensive, to cater for the less expensive SDRAM Intel had to incorporate a "translator" chip to convert the 820's signals from RDRAM to SDRAM and then back the other way. This appears to have introduced a significant delay and has resulted in overall performance that has been reported to be 10 percent less than a similarly equipped BX motherboard with some games.

The Lab will soon get to the bottom of this one as we are testing I820, I840 and VIA Apollo Pro 133-based motherboards for the next edition of PC Mag. Our yardstick will be a fast BX based motherboard and it will be interesting to see how they all really stack up.



Until quite recently the names on everybody's lips as far as mainstream premier 3D graphics chips were concerned was 3DFX and Voodoo. Crikey, there were plenty of games fanatics out there that installed a pair of Voodoo 2's in SLI mode just to play Quake 2 at higher resolutions and frame rates—the price of the two cards was initially a cool $1000!

Well the performance crown has sat squarely on the head of the slew of graphics cards based onVidia's GeForce chip since it made its debut here around October last year. 3DFX's next generation product has still not been released but is based on the VSA-100 chip whose specs such as a fill rate of 333Mpixels do not seem all that awe-inspiring. Apparently at CeBit 3DFX only had alpha silicon running at a mere 100MHz, when the release product is slated at 166MHZ to 183MHz. And it does not look too good for 3DFX, as nVidia's next generation of silicon had been up and running for around two months at the time. PC

Steven Turvey

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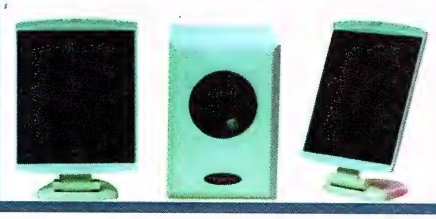
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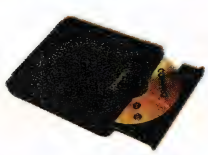
Specifications:

Amplifier
Power output - 20W rms
Input impedence - 10k ohm
Frequency response - 50 Hz - 20 kHz

Loudspeakers
Subwoofer - single cavity
Sound Panels - NXT Flat Panel Technology
Impedance - system compatible
Magnetically Shielded - yes



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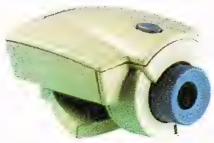
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More Fun with Photoshop

BY LUISA SIMONE

Professional artists are always on the lookout for a new tool that will wow the client or save time. MetaCreations' KPT 6 ($359) has the potential to do both. Like its predecessor, KPT 6 is not an upgrade to the previous version but is a new edition of image-editing filters in what is becoming a multivolume library.

The KPT 6 collection consists of eight Adobe Photoshop plug-ins. These filters share the streamlined interface with floating palettes that was introduced with KPT 5. Two bonus plug-ins, KPT SceneBuilder and KPT SkyEffects, look and feel like third-party programs, which is not surprising since they were recently purchased from RayFlect. Some of these filters are available individually on MetaCreations' Web site (www.metacreations.com).

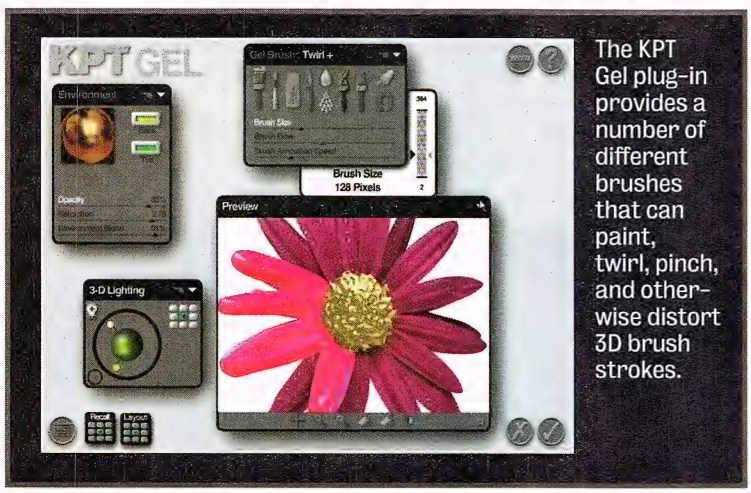
Several of the filters in this collection, including KPT Gel, KPTMaterializer, and KPT-Projector borrow imaging paradigms from the world of 3D modelling and rendering. Materializer and Gel both utilise complex surface materials that are built from texture and environment maps and illuminated with optically accurate light sources. Both modules can produce surfaces that simulate metals, plastics, or glass. KPT SceneBuilder and KPT SkyEffects bring true CAD functions into Photoshop's 2D environment.

KPT 6 also includes a few workhorse filters that enhance common image-editing tasks. The new Equalizer filter bests traditional unsharp masking by providing nine discrete visual frequency bands that can be individually sharpened or blurred.

For the most part, these tools enhance creativity. For example, KPT Goo squeezes all of the functionality—not to mention fun—of the standalone consumer program (Kai's Super Goo) into a plug-in, letting you twist, pinch, and even animate image distortions.

On a critical note: None of the plug-ins can preview multiple Photoshop layers. Nor can any of the filters generate an effect on a new, transparent layer. These shortcomings make coordinating or combining an effect with a multiple-layer composition difficult.

In a surprise move, MetaCreations recently announced plans to sell products such as KPT 5 and KPT 6 that are not central to its new business strategy, which focuses exclusively on e-commerce visualisation technology. Until a sale is final, MetaCreations promises to distribute and support both products.



The KPT Gel plug-in provides a number of different brushes that can paint, twirl, pinch, and otherwise distort 3D brush strokes.

KPT 6

Price: $359, upgrade $199. Requires: 32MB RAM; 65MB hard disk space; Microsoft Windows 95, 98, or NT 4.0; Adobe Photoshop 4.0 or later (or any application that supports the Photoshop plug-in specification). Scholastic New Media. Ph: 02 4328 3555; Fax: 02 4328 2205; www.scholastic.com.au / newmedia

SCAN ON THE GO:
This pocket rocket scans and stores up to 4MB of text. Page 52.



PINING FOR MUSIC:
The Pine D'music is an affordable, portable MP3 player. Page 42.



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HotMedia Puts It All Together

BY LUISA SIMONE

Are you looking for an easy way to add interactive multimedia elements to your Web site? Check out IBM's **HotMedia 2.5**. This nifty little utility—free for the download from **www.ibm-.com/hotmedia**—lets you assemble images, sounds, and hot links into a unique file format.

HotMedia's Multimedia Vehicle and Repository (MVR) format is actually a packetised collection of standard Web-compatible media assets, such as GIF or JPEG images, AU sound files, and links. To play these compositions, you need only several tiny Java applets. By segmenting the data and the Java player code, HotMedia can deliver a rich media experience over low bandwidth connections.

Version 2.5 has an improved interface that consists of a simple checklist menu and dialog boxes where you collect media elements and assign behaviours. You typically can create only one effect in any single MVR file. To generate multiple effects you must link multiple MVR files. Also new in this release is the ability to synchronise streaming audio to objects and time-based events and to generate panoramas from flat pictures.

HotMedia can be used to create auto-play animations similar to animated GIFs. But the program surpasses this conventional format by letting end users control behaviours such as zooming, panning, advancing flipbooks, playing sounds, and linking to other MVR files and URLs.

A single command (Publish) produces an MVR file, the Java classes, and an HTML file with the necessary JavaScript code. We also like the fact that HotMedia objects require no special server-side applications. In fact, smart MVR files pull the data and Java applets from the server using standard HTTP protocols.



HotMedia 2.5 lets you create a pannable panoramic image from a flat picture. A pop-up dialog box lets you add hot spots to the file.

Currently, HotMedia supports only raster-based image formats. Without vector or streaming video formats, Web developers must still compromise size or quality to optimise downloads. For example, "rotatable" pictures in HotMedia are not true 3D objects but are just a flipbook of still images photographed from different perspectives. Likewise, if you import an AVI file, HotMedia translates it into a less-efficient GIF or JPEG animation.

HotMedia 2.5 does not supply any graphics or sound-editing tools—the program merely combines elements you've already built using other tools. Nevertheless, IBM's HotMedia 2.5 is a no-brainer for Web developers.

HotMedia 2.5

Price: Free download. Requires: 32MB RAM; 5MB hard disk space; Microsoft Windows 95, 98, or NT 4.0. IBM. Ph: 13 24 26; Fax: 02 9951 9793; www.ibm.com/hotmedia

Listen to D'music

BY DAN COSTA

As perambulating audiophiles make the switch from CD to MP3, most of the attention has focused on units from Creative Labs and Diamond Multimedia. You don't hear much about Pine Technologies, but its D'music SM-320V delivers all the essentials the big names offer to the catchy tune of $500 on average.

Our evaluation unit came with an additional 32MB CompactFlash card which will set you back $179. This gave the evaluation unit a storage capacity of 64MB and more than two hours of music recorded at 128kbps. At that rate, the audio quality was clear and loud, and the bass was rich. As an added bonus, the D'music also records more than two hours of voice on 32MB of memory. The unit automatically converts audio files to WAV files when you upload them to your PC.

Measuring 1.52 x 6.35 x 8.25 cms (HWD), and weighing 70.87 grams without batteries, the D'music is just as portable as higher-priced units. It may not be as stylish, but you can dress it up in a black, blue, green, pink, or silver case. The two-line LCD is large enough to show song titles and artist names, and there's a built-in equaliser.

The D'music comes with separate applications for moving audio files to the player and playing them on your PC. (Most players come with one application for both purposes.) This makes using the D'music more complicated. To move files from a PC to the player, you use D'music MP3 Manager; to rip MP3s and play them on your PC, you can use one of two shareware products—Audio Catalyst or Musicmatch Jukebox 4.

Also, the unit lacks a USB interface. Moving a 4.5MB file took almost five minutes—an eternity compared with the 30 seconds it would take over a USB connection.

However, if you're looking for an MP3 player that offers good-quality sound, voice-recording capability, and a reasonable price, the D'music is playing your song.

D' music MP3 player

Price: $299. CDS Australia. Ph: 02 9748 8812; Fax: 02 9748 8815; www.pineaustralia.com.au



The compact and lightweight Pine D'music SM-320V MP3 player is an affordable rival to the Diamond and Creative MP3 players.

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Brilliant colour, super economy, optional PhotoRealism, better Internet printing,

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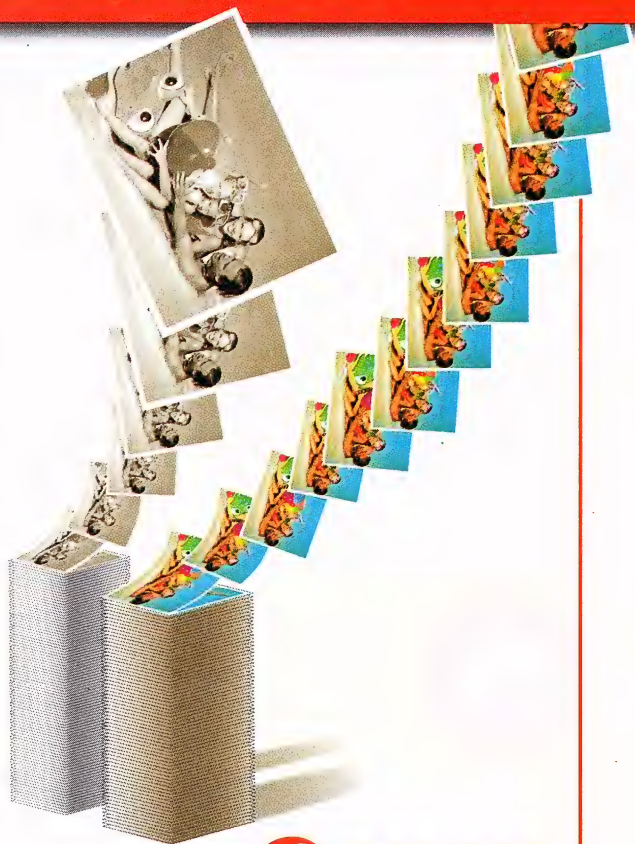


Photo Realism™

BJC-265SP colour Bubble Jet™ printer – $149RRP

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* Based on 5% page coverage for B&W and 7.5% coverage for colour, Super Economy not available with PhotoRealism inks. Price shown is the recommended retail price including tax. Canon and the Canon logo are registered trademarks and BJC, Bubble Jet and PhotoRealism are trademarks of Canon Inc. Windows is a trademark of Microsoft Corp. in the U.S. and other countries. Canon Australia Pty Ltd, ACN 005 002 951. CS8409

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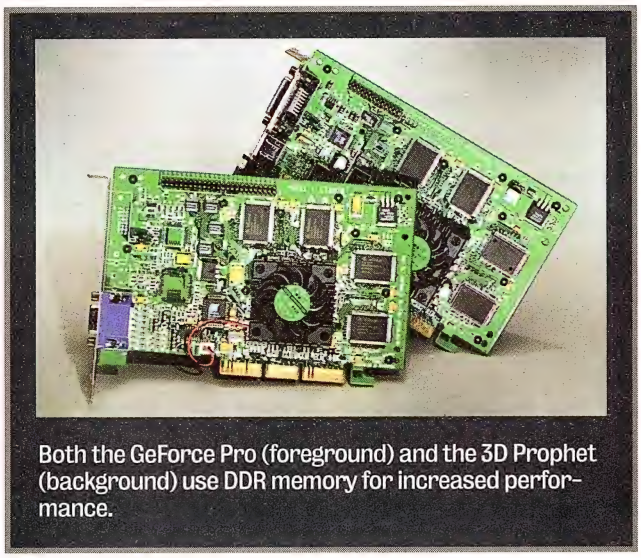
BY LOYD CASE

The fastest graphics chip can be crippled if it can't move the data from video memory to the graphics chip and back. One solution is to have multiple rendering engines, each with its own dedicated pool of memory. A more elegant solution is simply to use faster memory.

The current candidate for fast video memory is known as DDR SDRAM. DDR (double data rate) is a fine solution because it doesn't involve running the memory clock faster. Instead, two chunks of data are moved with each memory clock cycle. This technology essentially doubles the memory bandwidth of a graphics card.

We took a look at a pair of graphics cards that are among the first to use DDR memory: the Creative Labs 3D GeForce Pro ($599) and the Hercules 3D Prophet DDR-DVI ($699). Using the new nVidia GeForce 256 graphics accelerator chips, both cards proved to be among the fastest consumer-level 3D graphics cards available today.

What card you buy depends heavily on how you value the trade-off between software and hardware features. On the one hand, business users will like the DVI output on the Prophet, but the GeForce Pro's E-Color tools are also useful for heavy graphics users. The **Creative Labs 3D GeForce Pro** offers fewer hardware features than the Prophet but more software amenities. Like the Prophet, it ships with 32MB of 6ns (183MHz) DDR SDRAM. The GeForce Pro has only a single VGA output connector, although it does have an internal connector for a DVI daughtercard (currently not available). The GeForce Pro offers essentially identical performance to the Prophet; the key difference was in the Expendable test scores, which may be attributable simply to the difference in driver revisions. The card's 2D performance was also neck and neck with that of the Prophet. What's compelling about the Creative Labs card is the bundled software. On the gaming side, the card ships with the full version of a limited version of Evolva, an action game and some demo software. Of more interest to graphics and business users are the Colorific and 3Deep colour-balancing and colour-matching tools from E-Color.



Both the GeForce Pro (foreground) and the 3D Prophet (background) use DDR memory for increased performance.

Creative Labs 3D GeForce Pro

Price: $599. Creative Labs. Ph: 02 9666 6100; Fax: 02 9666 6900; www.australia.creative.com. Tech Support Ph: 02 9666 6500

The **Hercules 3D Prophet DDR-DVI** (now owned by Guillemot International) ships with 32MB of 6ns DDR SDRAM. The card also has a DVI interface for use with the new generation of flat-panel displays and digital monitors. Rounding out the output options is an S-Video TV output and a VGA connector.

The DVI output works well with the ViewSonic VP-181 digital flat-panel display. TV output is more limited, forcing the computer display to run at the same resolution and refresh rate as a TV monitor (800 x 600 maximum resolution at 60Hz). The control panel allows extensive customisation of 3D features and performance but is buried in a somewhat confusing interface.

The 3D Prophet is a nimble performer, coming through with some of the highest scores we've seen on our 3D WinMark 2000. It was no slouch in the 2D arena either, posting high scores on our ZD Business Winstone 99 and ZD Content Creation Winstone 2000 benchmark tests.

Of course, this card is aimed squarely at the high-end gaming market. It ran the Quake III Time Demo at close to 57 frames per second (at 1024 x 768, with 32-bit colour). Its fps rate while running Expendable at that resolution was also quite good.

Hercules 3D Prophet DDR-DVI

Price: $699. Acclaim. Ph: 03 9674 5900; Fax: 03 9674 5999; www.guillemot.com/australia/index.html

BENCHMARK TESTS

We tested 2D performance using ZD Business Win-stone 99 and ZD Content Creation Winstone 2000.Both are applications-oriented test suites. We collected 3D performance data using ZD 3D WinMark2000. We set up and ran 3D GameGauge 2.5, which was conducted with Quake III TimeDemo (from id Software) and Expendable (from Rage Software). We ran all performance tests on a Dell Dimension XPST550, with a 550MHz Pentium III processor, 128MB of SDRAM, an IBM 7200-rpm IDE hard disk, and a Toshiba 6X DVD-ROM drive.

High scores are bold. Bold type denotes first place.	3D GameGauge 2.5: Quake III Time Demo (frames per second) 1,024 x 768	1,600 x 1,200	3D GameGauge 2.5: Expendable (frames per second) 1,024 x 768	1,600 x 900	ZD Business Winstone 99 1,280 x 1,024	ZD Content Creation Winstone 2000 1,280 x 1,024	ZD 3D WinMark 2000 1,024 x 768	ZD Business Graphics WinMark 99 1,280 x 1,024	ZD High-End Graphics WinMark 99 1,280 x 1,024
Creative Labs 3D Annihilator Pro	56.4	21.0	**57.0**	28.4	23.3	**17.8**	69.3	205	602
Hercules 3D Prophet DDR-DVI	**56.5**	**21.6**	49.8	**39.9**	**23.5**	17.6	**69.5**	**208**	**610**

For 3D GameGauge, we disabled V sync. For the two Quake III tests, we set the texture slider at 2 (out of 3) and the filtering menu at trilinear. We ran all tests a 32-bit colour.



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New BJC-2000SP colour Bubble Jet™ printer – $199[RRP]

Canon

Price shown is recommended retail price including tax. Canon and the Canon logo are registered trademarks, and BJC, Drop Modulation Technology and PhotoRealism are trademarks of Canon Inc. All other trademarks are the property of their respective owners. 1. BC-20 Black and BC-22E PhotoRealism ink cartridges are optional. 2. B&W output for BC-20 ink cartridge at 5% coverage and colour output for BC-21e measured at 7.5% coverage. Canon Australia Pty Ltd ACN 005 002 951. CS/8411

Get to Know Your Network

BY LES FREED

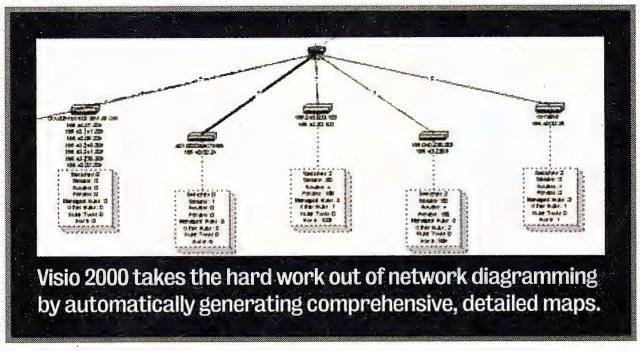
No matter how complicated your network, **Visio 2000 Enterprise Edition** ($1579) takes the grunt work out of documenting it. Like previous versions of Visio, Visio 2000 Enterprise Edition gives virtually anyone the ability to create clear, concise technical drawings with minimal effort. The program includes a library of over 18,000 manufacturer-specific network shapes—everything from the smallest eight-port Ethernet hub to large enterprise-class switches.

But the big news is Visio 2000's AutoDiscovery and AutoLayout features. These two technologies work hand in hand to help locate, document, and diagram all the equipment connected to your network.

Visio 2000 uses SNMP (Simple Network Management Protocol) to identify common network devices such as routers, switches, and managed hubs, but we were impressed with its ability to locate and identify non-SNMP devices such as Microsoft Windows PCs, print servers, and non-SNMP routers.

As Visio 2000 locates new devices, it builds a database of network equipment; the program's AutoLayout wizard uses the database to create a detailed, presentation-quality diagram of your network configuration. The resulting diagram is uncannily accurate; each piece of equipment is drawn as a picture that accurately represents the equipment's physical shape, down to the connectors and LEDs.

Web masters will appreciate the Web Layout diagram, which draws a detailed map of any Web site, complete with a list of all files, links, graphics, plug-ins, Java applets, and HTML documents. We were able to create a complete map of our server in about an hour.



Visio 2000 takes the hard work out of network diagramming by automatically generating comprehensive, detailed maps.

Visio 2000 can also import directory information from NetWare NDS, Microsoft Active Directory, and LDAP directory servers, so you can easily create a diagram of users, groups, and other directory objects using the data imported from your directory server.

Once you've created your diagram, you can store it, print it, or output it in dozens of formats, including HTML, PowerPoint slide show, or Vector Markup Language (VML). An embedded hyperlink processor lets users link a Visio shape to another Visio document, to a hyperlink on the Web, or to an external Microsoft Office document.

The new Visio 2000 Enterprise Edition retains the original product's simple, effective drag-and-drop interface that gives even the most artistically challenged user the ability to create attractive, understandable diagrams and drawings.

Visio 2000 Enterprise Edition

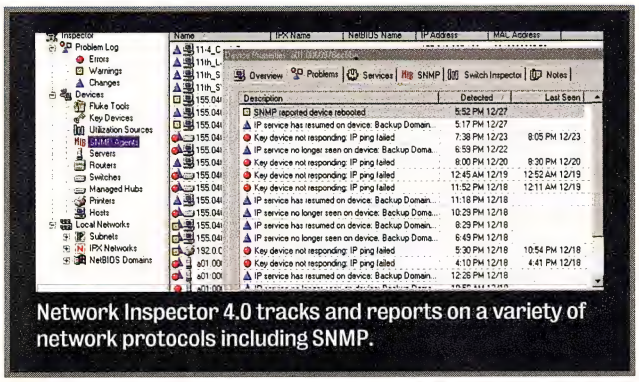
Price: $1579. City Software. Ph: 1300 658 600; Fax: 1300 658 010; www.visio.com.au

Uncover Network Problems

BY FRANK J. DERFLER, JR.

LANs have become more complex to manage and more likely to malfunction. Today, we have more problems with addresses and routing than with cables and hubs. Fluke Corp.'s **Network Inspector 4.0** software ($1750), part of a large family of Fluke network testing hardware and software, can uncover those subtle and annoying problems and tell you how to fix them.

Network Inspector discovers all of the devices on the network, not just IP devices, and monitors them for changes or errors. The program can graphically report on and inventory any devices using the IPX, NetBIOS, or TCP/IP protocols.



Network Inspector 4.0 tracks and reports on a variety of network protocols including SNMP.

Network Inspector listens to the network using agent programs running on PCs on each segment. Because the program gets behind switches, it can report on the health of and generate detailed reports on each switch. The agent programs report to one or more central console programs—depending on which package you buy.

Network Inspector can launch Visio 2000 Standard, Professional, or Enterprise Editions (see the above review); you can then feed the version you've selected information and use its icons and images of specific equipment to create a detailed network diagram. In about half an hour, we installed the software, monitored a network of several hundred nodes, and produced our first Visio diagram.

On our tests on a real-world network, Network Inspector immediately spotted many networked printers that were using a manufacturer's single, default IP address. Because Network Inspector can determine a device's network name, we were able to print out a detailed list of printers needing attention.

When we reviewed Version 2.1 in 1998, the software missed a few tricks, but we thought it was solid and easy to use. Now, the software doesn't miss anything, and it remains easy to use.

You can buy Network Inspector 4.0 as a direct download from Fluke's Web site. Start with the free 15-day trial package. The basic package ($1750) provides one console and the ability to monitor as many as 250 nodes. A five-console, 1,000-node package costs $17,160. Larger systems are available.

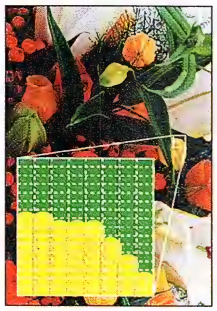
Network Inspector 4.0

Price: $1750. Fluke. Ph: 02 8850 3333; Fax: 02 8850 3300; www.fluke.com

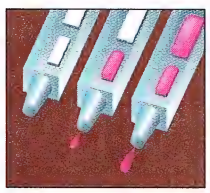
Hard to imagine
1440dpi @ $299.

Imagine this. Extraordinary quality, superb blacks, great speed, automatic image improvement, parallel and USB ports, optional PhotoRealism and scanner cartridges. It's the new BJC-3000.

1440 dpi, with variable drop sizes. The inks are optimised for plain paper, print in resolution up to 1440 dpi, and use Drop Modulation Technology™ with variable ink drop sizes for smoother colour gradations and finer lines.



Resolution up to 1440 x 720 dpi.



Variable ink drop sizes improve definition.

You get brilliant colour with high speed bi-directional printing up to 9 ppm in black & white and up to 4 ppm in colour, text and graphics!

The PhotoRealism advantage. An optional PhotoRealism cartridge uses specially formulated low-density inks for more colour combinations per dot than conventional CMYK ink. The result is stunning photographic reproduction with smoother colour gradations and reduced grain.

Automatic Image Improvement. There are two selectable, automatic functions to improve digital images. Photo Optimiser adjusts photographs for defects in exposure, highlights and shadows.

Image Optimiser can "correct" low-resolution Internet images up to the printer's maximum resolution.





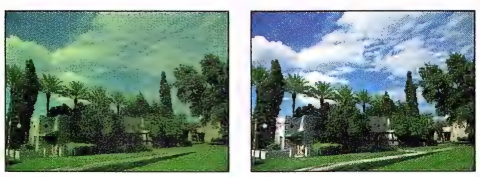
Superb operating economy. The ink detection system monitors ink levels and alerts users when a tank is running low. All ink tanks can be replaced separately from the print heads. This reduces operating costs, while helping to prevent running out of ink during a print job.

Turn your printer into a scanner. An optional scanning cartridge delivers resolution up to 720 dpi.

Parallel and USB interface. Both ports are built-in for Windows® and Macintosh?

Canon Customer Care. The BJC-3000 features a one-year warranty upgradeable to three years for a minimal charge, and is backed by Customer Care info-line support.

For more information call us on 1800 021 167.



Automatic image improvement refines both photographic and Internet images.

Photo Realism™

New BJC™-3000 Colour BubbleJet™ printer – $299RRP

Canon

Price shown is recommended retail price including tax. Canon® and the Canon logo are registered trademarks and Bubble Jet, BJC, the Colour BubbleJet logo, Drop Modulation Technology, PhotoRealism and the PhotoRealism logo are trademarks of Canon Inc. Windows® is a trademark of Microsoft Corporation in the US and in other countries. Macintosh and Mac are registered trademarks of Apple Computer Inc. 1.Print speeds vary with the content of the document and the processing speed of the host computer. Black & white print speeds require optional BC-30 black cartridge. 2. Printer driver support is provided for Windows® 95/98/NT 4.0 for the parallel port and pre-installed Windows® 98 and Macintosh OS.8.1 or later using the USB port. Canon Australia Pty Ltd ACN 005 002 951. CS9193

HP LaserJet 3150 Series Now Net-workable

BY BRUCE BROWN

Hewlett-Packard's new **HP LaserJet 3150** ($1499) adds networking capability to an earlier model, the LaserJet 3100. The LaserJet 3150 combines 600-dpi, 6ppm printing, copying, and scanning with standalone fax and PC-based fax functions.

The LaserJet 3150 measures 38.8 x 30.48 x 59.69 cms (HWD) with all trays and paper guides extended. The printer input and output trays both hold 100 sheets, and the ADF (automatic document feeder) can hold 30 source-document pages for copying, faxing, and scanning. The HP unit's 2MB of fax memory holds approximately 150 typical fax pages.

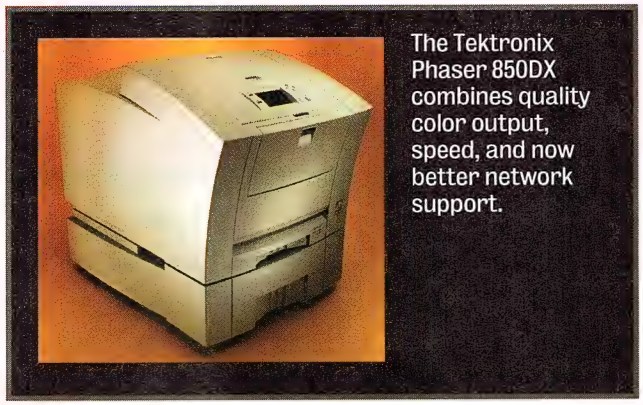
Both the printing and fax services can be accessed via an optional print server, such as the HP JetDirect 170X Print Server ($390).

HP's JetSuite Pro software supports drag and drop, links to major programs such as Microsoft Office applications, and automatically pops up a menu on the computer screen when a source document is placed in the ADF tray.

If you don't need colour printing capability, the HP LaserJet 3150, with typical laser-sharp printing and new networking capability, is a reliable, easy-to-use, all-purpose workhorse for small-business and SOHO applications.

HP LaserJet 3150

Price: $1499. Requires: 16MB RAM for Microsoft Windows 95 or 98, 32MB RAM for Windows NT 4.0, 64MB RAM for Windows 2000; 65MB hard disk space. Hewlett-Packard. Ph: 13 13 47; Fax: 03 9898 1968; www.hp.com.au



The Tektronix Phaser 850DX combines quality color output, speed, and now better network support.

A Smarter Tektronix Printer

BY M. DAVID STONE

Tektronix printers have the reputation for high-quality output at reasonably fast speeds, but their Achilles' heel has always been a lack of network support. The **Tektronix Phaser 850DX** ($9789, as tested) is out to change all that. This solid-ink (resin-based) colour printer adds network support, which ranges from good (for remote administration) to superb (for installation). And Tektronix throws in IPP (Internet Printing Protocol) for good measure.

To say that we were impressed with the network installation is an understatement. If you're working with Microsoft Windows 9x or NT 4.0, setting up the 850DX on a network consists of little more than putting the CD-ROM in a drive and running the install routine. Install finds the 850DX on your network and checks whether the unit has an IP address assigned. If the system doesn't, the installer finds a free IP address for you.

Quite simply, this is the slickest network printer installation we've seen. And installing the driver on additional systems is just as easy. The process is a bit less automated for Microsoft Windows 2000 but still doesn't require much knowledge of networks. Note, too, that the printer works with the IPP feature in Windows 2000 for printing over an intranet or the Internet.

Remote management is a little less impressive. Although the printer still lags behind in this feature compared with similar units from industry leaders Hewlett-Packard and Lexmark, the 850DX is now finally in the same league with them.

Output quality varies with resolution, which ranges up to 600 by 1200 dpi. In general, text delivers well-formed, dark characters; graphics offer brilliant colours with little or no visible dithering at the two highest resolutions; and photos are true photo quality at the highest resolution.

Performance is also impressive, particularly for colour output. We timed a 50-page text file at under 7.0 minutes in standard mode, a 12-page PowerPoint presentation at 3.5 minutes in enhanced mode, and a full-page photo at just under 6.0 minutes in highest quality mode.

All these traits make the Tektronix 850DX a highly attractive package for the small office, workgroup, or department.

Tektronix Phaser 850DX

Price: As tested, with high-capacity paper tray, 128MB RAM, built-in two-sided printing, 6GB hard disk, $9789; base model, $4995. Tektronix. Ph: 1300 369 519; Fax: 02 9888 0125; www.tek.com/color_printers.



The HPadds networking capabilities to it's multifunctional LaserJet 3150.



1440 DPI, Drop Modulation Technology

and Individual Ink Tanks.

If you demand speed, quality and economy from your printer, look no further than the new Canon BJC™-6000.

New see-through ink tanks. What really distinguishes the BJC-6000 is the new ink tank system. For better operating economy there are individual see-through ink tanks for all colours. Each is separate from the print heads, significantly reducing operating costs and allowing you to replace only the empty tank.



The think tank system. Each ink tank has a prism moulded into the bottom. A beam of light measures ink status, and a monitor in the printer driver keeps users up to date on the amount of ink remaining in each cartridge.

More life-like colour. An all-new driver emphasises colours as they are perceived by the human eye. The result is natural colours with more subtle variations in dark shaded regions, and better gradations in highlighted areas. PhotoRealism with a six-colour ink system and Drop Modulation further enhance quality, even on plain paper.

1440 X 720 dpi. Drop Modulation Technology™ generates droplets around one-third the size of conventional droplets giving you high resolution printing at 1440 X 720 dpi. The result is a sharper image with smoother tonal gradations.

Sharper Black Text. Drop Modulation Technology is now available for the first time with a black cartridge to help eliminate grain in text. At the same time newly developed black ink gives sharper, clearer text with improved water resistance.

New, high-performance engine. An innovative new engine design provides the fastest print speeds, in both black & white and colour, of any Canon Bubble Jet printer.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers are available for Windows® 95/98/NT and an optional USB conversion kit is available with drivers for Windows 98, iMac and Mac G3.

If you are looking for performance and economy, you've found it in the new BJC-6000. For more information please call us on 1 800 021 167.

Photo Realism™

New BJC-6000 – $399RRP

Canon

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CS/9214

Norton Moves to the Net

BY LARRY SELTZER

In light of the fact that the Internet has many more threats other than viruses, responsible companies protect their networks with firewall software. Symantec has released Norton Internet Security (NIS) 2000 ($99.95), a "personal firewall" product that mixes these functions with parental monitoring and Web ad blocking. The product usually works well but, at times, it blocks information that you might want to see.

Although NIS looks like a new product, it is based on AtGuard, a personal firewall product that Symantec licensed from WRQ. NIS retains the advanced configuration feature as an option but has simplified the main interface, letting users choose low, medium, or high levels of protection.

The firewall lets you block ActiveX controls and Java applets, as well as more primitive TCP/IP attacks, and has special built-in rules designed to block hack attacks from notorious programs such as BackOrifice. The list of safeguards is adequate, but NIS could better describe what happens when it blocks something—all the user gets are numbers summarising how many blocks have occurred.

The ad blocker monitors Web page loading, determines which graphics are advertisements, and stops them from downloading. But we found some Web pages in our own ZDNet Community for which the feature blocked non-advertising graphics, rendering the pages unnavigable. We were able to adjust the ad blocker's advanced properties to correct the problem, but this was a complicated process.

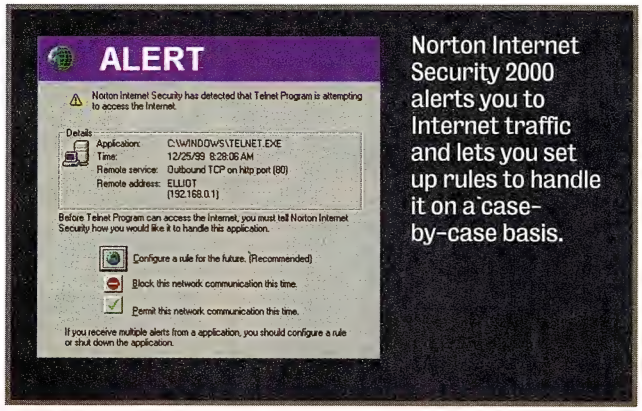
The Parental Control feature has bigger holes, although it will certainly block access to most objectionable content. A database of such sites, categorised with such terms as Crime and Drugs/Advocacy, lets the system administrator select which categories to block. Another option is to block all sites by default and then create an exception list of acceptable sites. This scheme doesn't block objectionable content that arrives via e-mail.

The Norton LiveUpdate feature updates the Parental Control database as well as the software itself. A copy of NIS includes a one-year subscription to updates.

As expected in Version 1.0, NIS has some minor bugs. But in general Symantec has done a fine job of taking the advanced technology in AtGuard and giving it a friendlier face.

Norton Internet Security 2000

Price: $99.95. Requires: 24MB RAM (32MB recommended), 60MB disk space, Microsoft Windows 95 or 98. Symantec. Ph: 02 8879 1000; Fax: 02 8879 1001; www.symantec.com.au



Norton Internet Security 2000 alerts you to Internet traffic and lets you set up rules to handle it on a case-by-case basis.

Out-of-Site Editor

BY EDWARD MENDELSON

Already one of the top tools for designing professional-looking Web pages with little or no knowledge of HTML, NetObjects Fusion is now a premiere program for building entire sites. Improvements such as the ability to view and edit code, better support for Cascading Style Sheets (CSS), and advice on everything from planning to promoting your site make **NetObjects Fusion 5.0** ($569) the Web site editor of choice for home and small-business users.

Unlike Microsoft FrontPage 2000, Fusion unfortunately still cannot open more than one site at the same time, and the program still makes you jump around its various views—from site structure, page editor, stylesheet selector, file listings, and publish settings. But Fusion 5.0 surpasses FrontPage 2000 by offering customisable navigation bars. Fusion 5.0 also provides the same precise control over layout found in desktop publishing programs.

This new version retains the basic interface of earlier versions. The site management view lets you copy and paste pages to another region of the site, simplifying layout reproduction. Microsoft Word documents can be imported directly into a site and then reformatted to match the site style. The page-editing view includes two new tabs—one that displays the complete HTML code for the current page and a second that previews the page in Microsoft Internet Explorer. The HTML tab lets expert users insert custom code between tags generated by Fusion.

Fusion's style management page—from which you select graphics and text styles that apply to part or all of a site—now supports Cascading Style Sheets (CSS). The publishing page now supports background uploading, so you can edit pages while transferring files and optionally delete remote pages before uploading new ones. The new Online page includes advice on creating and promoting Web sites, with links to third-party add-ins and other enhancements to Fusion itself.

For text-heavy sites with little page design, FrontPage is still better than Fusion. But for effortless and visually spectacular Web sites, NetObjects Fusion 5.0 will get the job done.



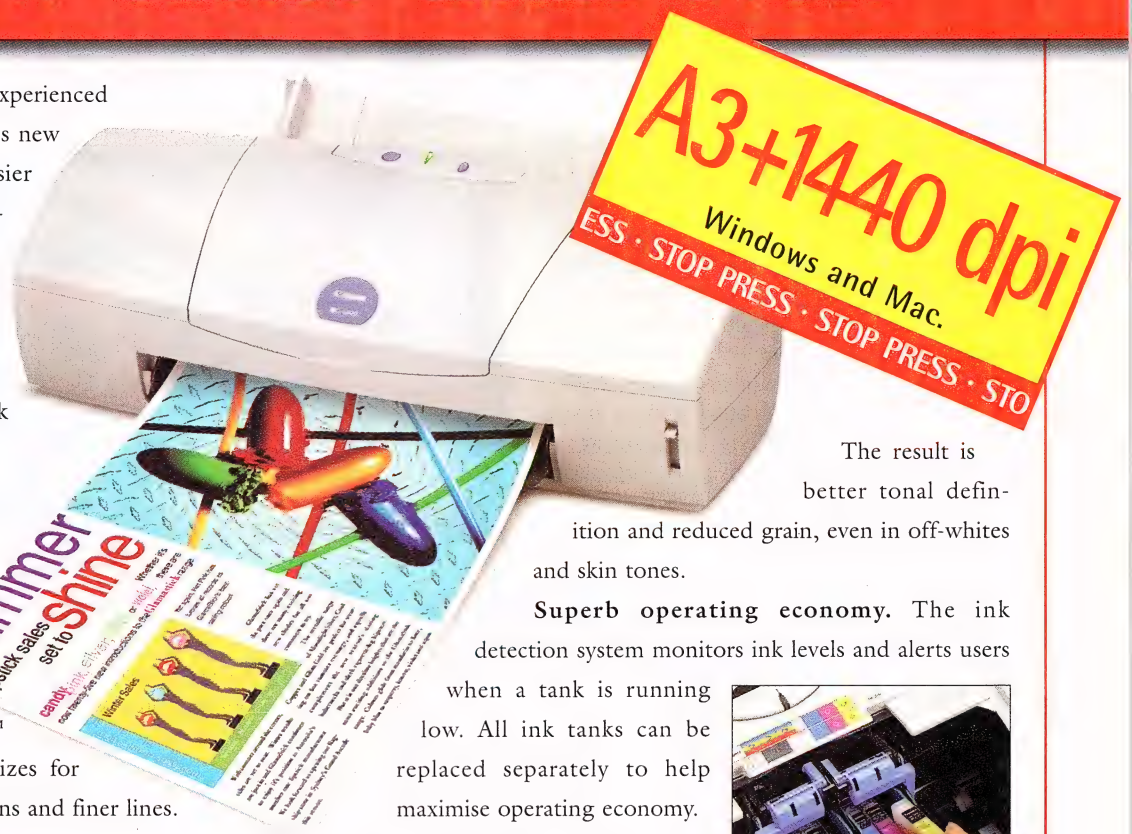
Fusion 5.0's new online view provides advice and links for building Web sites but doesn't directly alter the site you're editing.

NetObject Fusion 5.0

Price: $569; upgrade, $195. Requires: 32MB RAM, 50MB hard disk space, Microsoft Windows 95 or NT 4.0 or later. Firmware. Ph: 02 4725 8000; Fax: 02 4721 7215 www.firmware.com.au

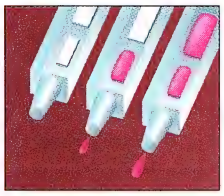
From work at home to artwork and publishing to CAD, big jobs are

now easier than ever.



Whether you're an experienced or first-time user, Canon's new BJC-6500 makes it easier than ever to get professional print quality in sizes up to A3.

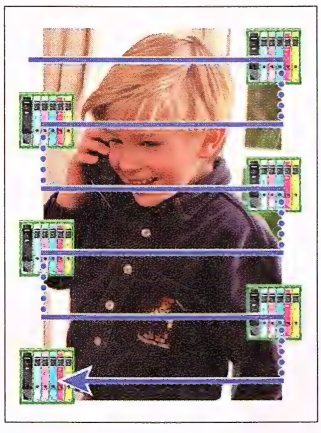
1440 dpi, variable drop sizes. Extra-rich black and colour ink cartridges are included in the box. The inks are optimised for plain paper, print in resolution up to 1440 dpi, and use Drop Modulation Technology™ with variable ink drop sizes for smoother colour gradations and finer lines.



Variable ink drop sizes improve definition.

Fast throughput. The dual cartridge system also employs bi-directional printing for speeds up to 9 pages per minute in black & white and up to 6 ppm in colour, text and graphics.[1]

Optional PhotoRealism. The process utilises a 6-colour high/low density ink system for far more colour combinations for photographic printing.



High-speed bi-directional printing.

The result is better tonal definition and reduced grain, even in off-whites and skin tones.

Superb operating economy. The ink detection system monitors ink levels and alerts users when a tank is running low. All ink tanks can be replaced separately to help maximise operating economy.



Exceptional operating economy, replaceable ink tanks.

Turn your printer into a scanner. An optional scanning cartridge delivers resolution up to 720 dpi.

Parallel and USB interface. Both interface ports are built-in for Windows® and Macintosh.[2]

Canon Customer Care. The BJC-6500 features a one-year warranty upgradeable to three years for a minimal charge, and is backed by Customer Care info-line support. Call us on 1800 021 167 for more information.

Photo Realism™

New BJC™-6500 Colour BubbleJet™ printer – $749[RRP]

Canon

Price shown is recommended retail price including tax. Canon® and the Canon logo are registered trademarks and Bubble Jet, BJC, Drop Modulation Technology, PhotoRealism and the PhotoRealism logo are trademarks of Canon Inc. Windows® is a trademark of Microsoft Corporation in the US and in other countries. Macintosh and Mac are registered trademarks of Apple Computer Inc. 1. Print speeds vary with the content of the document and the processing speed of the host computer. 2. Printer driver support is provided for Windows® 95/98/NT 4.0 for the parallel port and pre-installed Windows® 98 and Macintosh OS 8.1 or later using the USB port. Canon Australia Pty Ltd ACN 005 002 951.

CS9194

Put a Scanner in Your Pocket

BY BRUCE AND MARGE BROWN

Think portable scanners are too bulky for your mobile computing arsenal? Look again. The WizCom QuickLink Pen Personal Scanner ($399)is designed for low-volume text scanning. It functions like a digital highlighter to capture lines in articles, notes, business cards, memos, and books at 400dpi resolution.

The device weighs roughly 1.7 kg, runs on two triple-A batteries, and connects to a PC via a serial cable and also by infrared). With practice, you can expect good accuracy from the QuickLink Pen. Using the WizCom QuickLink Pen Personal Scanner either as a portable text scanner or as a desktop peripheral to scan text directly into Windows applications, you can scan text in 6- to 22-point text, in either a left-to-right or right-to-left direction. The QuickLink Pen boasts 2MB of flash memory for text storage and an upgradable 2MB of ROM for applications.

Seven controls are easy to access and operate by thumb; the 3-line, 25-character-per-line display is viewable while you scan.

To capture text, hold the QuickLink Pen at a 75- to 90-degree angle from the paper and gently guide it across a line. In testing, after a few minutes of practice, we captured most text lines accurately on the first try.

WizCom QuickLink Pen

Price: $399. Requires: 16MB RAM; 8MB hard disk space; Microsoft Windows 95, 98, or NT 4.0 or later. Wizcom Australia. Ph: 03 9221 8202; Fax: 03 9221 8338; www.wizcom.com.au



No ordinary pen, the WizCom QuickLink Pen successfully captures snippets of text so that you can refer to them later.

NetComm SmartWireless PC Card & Access Point

BY MARK SNELL

We reviewed wireless networks in February, but the NetComm equipment arrived too late to be included in the full review, so we include it here now.

The 2Mbps SmartWireless PC Card & Access Point provide an entry-level wireless solution for the SOHO Market.

The SmartWireless PC Card fits into a single Type 2 slot, leaving the other slot free for another PC Card. The PC Card installation is very easy under Windows 9x, simply plug the PC Card into the PC Card slot, and Windows detects the card and installs the drivers from the accompanying CD. Drivers were included for Win95/98/NT/Linux, though only Windows 98 drivers were tested.

The PC Card had a small built in antenna protruding from the end of the card. This area also houses three LEDs. There is no mention in the manuals of what these LEDs indicate, but from our observation, they seem to be: Power, Connection, and Activity.

The Access Point is an all-in-one unit and very simple to install. You plug in the power, plug in a landline LAN cable and screw the antenna into its socket. The Access Point is better placed high off the ground to avoid interference, and should be placed centrally to the area that needs to be covered by the wireless network. The configuration software is simple but only available from Windows workstations.

The base station can also be configured as an adaptor, via a crossover ethernet or serial cable, this is called Station Adapter Mode.

The Access Point provides visual feedback in the form of five LEDs: Power, LAN Activity, Wireless Activity, Alive Status which indicates that the SmartWireless LAN Access Point is working normally, and Link Status, which is always lit when the SmartWireless LAN Access Point unit works in Access Point mode and blinks when it is in Station Adapter mode.



Security is provided by allowing access to a range of MAC numbers, while all other devices will be blocked.

Range is rated as approx. 350m in an open environment and 70-80m in a closed environment, with transparent roaming between access points.

Each Access Point has the capacity to support up to 20 devices, but for optimum performance it is recommended that each Access Point supports a maximum of 20 users.

The SmartWireless solution provides an excellent package, but the 2Mbps limit is too slow compared with the new 11Mbps systems available (although 11Mbps units are promised soon).

NetComm PC Card & Access Point

Price: PC Card $599, Access Point $1499. NetComm. Ph: 02 9424 2000; Fax: 02 9424 2011; www.netcomm.com.au

PORTABLE

ESS · STOP PRESS · STOP PRESS · STO



Canon BJC-80
$399RRP

Canon BJC-50
$699RRP



Advanced colour, cable-less communications, optional scanner plus two sizes that are

Small and smaller!

Canon has a wonderfully new idea for people that need a portable printer. A choice.

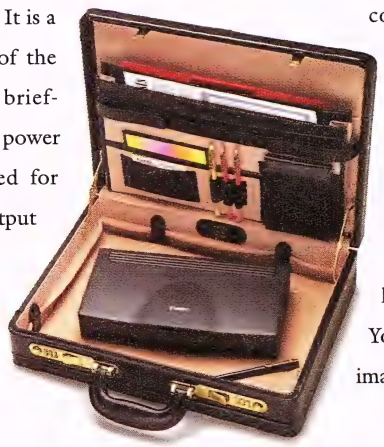
On the small side there is the BJC™-80. It is a fraction of the size of a briefcase. Yet, with its in-built sheet feeder and power adaptor included as standard, it is designed for people who have to produce high volume output from a very small printer.

Drop Modulation Technology.

Conversely, if size is critical, there is the brand new BJC-50 with in-built battery. It's not just small, at approximately half the size of the BJC-80 it's absolutely tiny.

Equally impressive, their performance is as big as their size is small.

Using Canon's advanced Drop Modulation Technology™ you can print everything from colour charts, to high quality photographs. Or, in seconds you can convert to extra high-speed black and white for finished business documents using the dedicated black cartridge with 128 print nozzles! For greater portability, both models include an infra-red port for totally cable-less communications with any suitably equipped Windows® 95/98 notebook or PC.



The BJC-80 fits in approximately half the space of a briefcase. The BJ-50 is approaching 50% smaller still.

Optional colour scanner.

And, if you really need the functionality of an office in the space of a briefcase, both models will accept an optional colour scanner head in place of the print head. It takes only seconds to change the heads. You can then use the scanner head to acquire colour images, or for fax and OCR functions.*

Cable-less communication.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers are available for DOS, Windows 3.1x/95/98 and Windows NT.

If you need help choosing between small, and smaller, give us a call on 1 800 021 167.

Canon portable colour Bubble Jet™ printers

Canon

Prices shown are recommended retail prices including tax. *Scanner-head works with Windows 95/98 only. Fax and OCR software not included with purchase. Canon and the Canon logo are registered trademarks and Drop Modulation Technology, Bubble Jet and BJC are trademarks of Canon Inc. Windows is a trademark of Microsoft Corp. in the U.S. and other countries. Canon Australia Pty Ltd ACN 005 002 951.

CS6019

Online Bookmarks

BY ALAN COHEN

It may not be exactly like collecting Picassos, but putting together a comprehensive, carefully chosen set of Internet bookmarks is an art form in itself. The result: the Web's greatest hits, just a mouse click away—as long as you're on your own computer. Use someone else's PC and you're stuck with someone else's favourite links. Or, at least, you used to be.

Enter the latest no-brainer concept to hit the Internet: online bookmarks. Just like e-mail, appointments, and files that you already store online, your prized URLs can be stored on a Web server, letting you access them from any browser, anywhere.

We looked at three such services: Blink (*www.blink.com*), Clickmarks (*www.clickmarks.com*), and HotLinks (*www.hotlinks.com*). A fourth, Bookmark City (*www.bookmarkcity.com*), was not available for testing in time for publication. All of these services let you transfer your bookmarks to a personal Web page, add new favourites, and organise your collection. But that's just the beginning.

These sites take advantage of the Web's two key attributes: its ubiquity and its power to foster community. To varying degrees, all let you share your bookmarks and contribute to a common database of links. Although these services claim to work with any version of Microsoft Internet Explorer or Netscape Navigator, you'll get best results with Versions 4 or later.

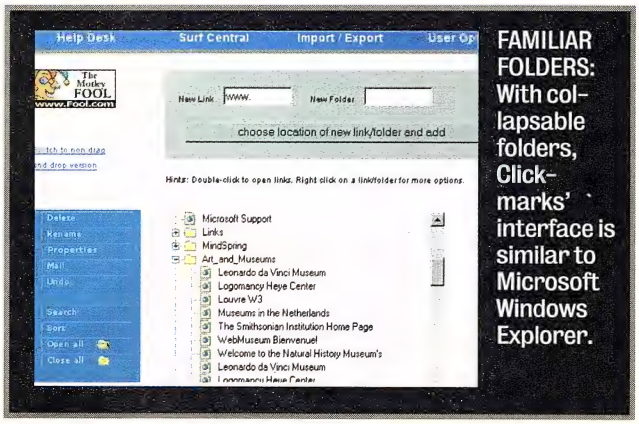
In almost every way, Blink stands out from the pack. Its community features are unrivalled. You can create a folder, fill it with links, and then share it with other Blink members, setting the level of access you desire: view links only, view and add links, or full ownership rights whereby links can be moved, renamed, and deleted. Blink's Public Library, a searchable knowledge base of user-contributed bookmarks, features a Yahoo!-like index.

Blink also makes it easy to export Web-based links back to your browser. At Clickmarks the process is much more cumbersome—and HotLinks doesn't let you export at all. Finally, when it comes to organising and sorting bookmarks, Blink again comes out on top.

Blink

Blink is the bookmark site to beat. With its tutorial, tabbed interface, and intuitive buttons, it's the easiest of the services to use. And with powerful link management and sharing capabilities, it's also the most sophisticated.

Log on at Blink's home page and you'll see a list of all your bookmark folders, as well as any links stored in the root directory. This structure is cause for our only significant gripe. Each time you click on a folder of links, Blink loads a new Web page to present that folder's contents. Clickmarks takes a better approach with expandable and collapsable folders, so all of your bookmarks can be viewed on a single screen.



FAMILIAR FOLDERS: With collapsable folders, Clickmarks' interface is similar to Microsoft Windows Explorer.

Blink offers a variety of ways to add new bookmarks to your online collection. If you're already at Blink, you can manually type in URLs. If you are at the site you want to add and not logged on at Blink, you can use the LinkAdder—a special bookmark Blink adds to your browser. Click on it and the current site's link is stored at Blink. Finally, if you're not on your own computer, there's Blinker, an applet that downloads from Blink's site and runs in any browser.

Blink lets you sort your links alphabetically or by hits, last use, category, rating, or date added. You can drag and drop bookmarks from one folder to another and highlight important links. A related-links feature examines your folder's name and suggests additional bookmarks from Blink's own database.

Sharing features are superb. When you create a folder, you can make it public, public but anonymous (meaning others can access the links but won't know their origin), or private. If made public and not anonymous, a folder will be listed at your personal Blink page, which can be accessed by any Blink member who searches for your user name, real name, or e-mail address. Visit another member's page and you can add that user to your well-integrated address book. You can also append any of their shared folders to your own directory and track new links—meaning that a link added to a shared folder will be added to your own collection.

Blink. *www.blink.com*



BLINK'S LINKS: Blink offers a tabbed interface and buttons that simplify keeping track of links.

Clickmarks

Like Blink, Clickmarks offers three ways to add links: by entering URLs at the Clickmarks site, by a special bookmark stored on your PC, or by downloading an applet—the Floating Link Adder—from any browser. But features are less elegant here.

For example, when you import bookmarks, you have the choice of appending to your current Clickmarks collection or overwriting it. If you append,



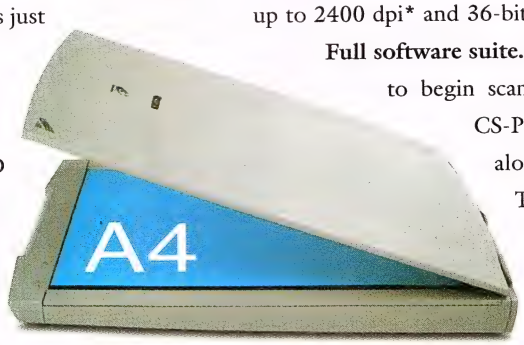
Canon's patented new LIDE technology helps these new scanners

break the price/quality barrier.

Reinvent is the most over used word in the computer business. But this time it's true. Canon has just reinvented scanners.

And not a little bit, but completely.

Introducing LIDE.™ Using a new, patented technology called LIDE (LED Indirect Exposure), we have fundamentally changed the way scanners work, and their price/performance ratio.



LIDE eliminates the need for costly, complex optical mirrors in image acquisition, while it maintains superior image quality and colour clarity.

Easy to use. At the same time, LIDE allowed us to design a smaller, sleeker scanner with an exceptional combination of beginner and expert controls, and with easy to connect (daisy chain) parallel port connections for Windows® 95/98 and NT 4.0.

The new CanoScan™ FB 330P and FB 630P offer a choice of 300 or 600 dpi optical resolution, plus enhanced resolution up to 2400 dpi* and 36-bit colour acquisition as standard.

Full software suite. Both come with everything needed to begin scanning immediately. The CanoCraft CS-P software works for both stand-alone image acquisition, and as a TWAIN driver for other applications. It features new, easier to use controls, and advanced controls for colour matching and image definition. Also included are PhotoExpress for image editing and OmniPage LE for OCR, a CD-ROM with full tutorial and user's manual, a parallel cable and power supply.

LIDE LED Indirect Exposure

Canon Customer Care. The FB 330P/630P scanners feature a one-year warranty upgradeable to three years for minimal cost, and are backed by unlimited hot-line support.

The new CanoScan FB 330P and FB 630P. You can see they are different at first glance. To learn more call 1 800 021 167.

Photo Realism™

FB 330P – Now $149RRP
FB 630P – Only $199RRP

Canon

Prices shown are the recommended retail prices including tax. Canon Australia Pty Ltd ACN 005 002 951. *Enhanced resolution dependant on driver and software used. Canon and the Canon logo are registered trademarks and PhotoRealism, CanoScan and LIDE are trademarks of Canon Inc. Windows is a trademark of Microsoft Corp. in the U.S. and other countries. All other trademarks are the property of their respective owners. Canon reserves the right to change specifications without notice. CS9059

Clickmarks will add everything in your bookmark file—even those links it has imported previously. Fortunately, there is a utility to search for and delete duplicate links. You'll need it.

Exporting is similarly cumbersome. Netscape Navigator users must save their Clickmarks directory as an HTML file, which has to be loaded manually into the browser. Microsoft Internet Explorer users have a even worse setup: Links must be saved as Netscape bookmarks, then converted—via a program you have to download—to IE favourites and loaded into the browser.

The user interface could use some work, too. Clickmarks lets you expand and collapse folders on the fly, but if you import hundreds of bookmarks, you'll find them spread over several pages. That's because Clickmarks sets a limit to the number of links it will display on one page. You can manually boost this limit, but it's an extra step you shouldn't have to take.

On the upside, there are some nice touches here. You can store password and user name information for sites you bookmark, so Clickmarks can automatically log you in (though saving passwords on a server en masse did give us pause). Links can be dragged and dropped between folders, and there is a handy undo command.

Community features, however, are limited. You can e-mail individual bookmarks and entire folders, but there is no address book. And though you can view folders other users elect to share, you can't append them to your own directory, à la Blink.

Clickmarks. *www.clickmarks.com.*

HotLinks

HotLinks wants to offer your bookmarks to the world—even if that's not quite what you had in mind. Input your links, and they are made public and attributed to you. You can manually reset bookmarks to private, but maybe not before your friends learn about your Britney Spears obsession.

Your public page—accessible to anyone who searches for your name—will list your e-mail address by default. You may want to change this setting.

Given how forcefully HotLinks pushes sharing, we were surprised to find limited community-building features. You can search public folders, but if you want to add a link to your own collection, you have to call up the site and manually add it. There is also no Web-based applet to let you add sites while you're using someone else's machine. You have to log on at HotLinks and input URLs by hand.

There are other disappointments: you can't move links by drag-and-drop, and you can't export bookmarks back to your browser. You can e-mail your links to friends, but you won't be able to keep an address book. HotLinks will store your bookmarks, but right now, it's pretty much a one-trick pony.

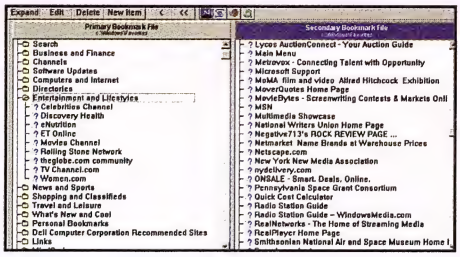
HotLinks. *www.hotlinks.com.*



HOT AND COLD: HotLinks lets you store bookmarks online, but it offers little else.

Bookmark Utilities

If you use both Microsoft Internet Explorer and Netscape Navigator, you may find it difficult to keep your bookmarks in sync or pass some bookmarks from one browser to the other, since each browser stores URLs in an entirely different way. Fortunately, a pair of free utilities (available at ZDNet Australia Downloads and other popular download sites) let your bookmarks travel.



MERGE AHEAD: *With Columbine Bookmark Merge, you can merge all bookmarks or selected folders.*

Columbine Bookmark Merge (CBM) is a handy piece of software (839KB compressed) that merges bookmarks not only from Internet Explorer and Navigator, but also from Opera and NCSA Mosaic. It's a snap to use, too. On screen, you'll see two windows: one for your primary bookmark file, the other for your secondary file. Load one browser's favourites into the primary window; load another set into the secondary. You can then merge the secondary file into the primary file or just merge selected folders.

CBM compares links by name, URL, or both—you choose. If it finds a match, it looks to replacement rules which, again, you set. CBM will overwrite the primary file's bookmark if the secondary file's is newer or was used more recently.

If you use three, or even four, browsers, you simply repeat the process, loading each set of bookmarks into the secondary window and setting the merge criteria. In the end, you'll have all the links you need in one file, which can be saved in the bookmark format of your choice.

You might also want to check out PC Magazine's own SyncURLs (375KB compressed). It synchronises Internet Explorer and Navigator bookmarks, making it easy to keep an identical set within each browser. When you launch SyncURLs, it looks for all the bookmarks on your system—no matter the browser—and loads them into a special library file you can view and manipulate within the program. A drag-and-drop feature eases the chore of organising your links into folders (you can add new folders, too). When everything looks good, you can export the library to either browser—or to both—via a single click. And you've have just what you need: one melting pot of bookmarks.

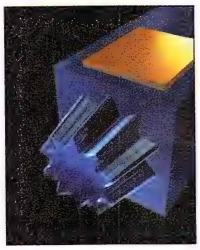
—Alan Cohen

1200 x 1200 dpi, 33 tonal levels and a 4 pico-litre droplet all contribute to Canon's new

MicroFine Droplet Technology.

With the new BJC-8200 quality can no longer be defined by conventional measurements alone.

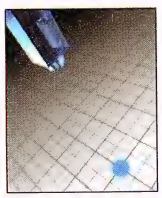
Smaller, better ink droplets. Quality starts with a process called MicroFine Droplet Technology.™ It produces 4 pico-litre ink drops. Each droplet is centre-weighted, creating a near perfectly round droplet, for far more accurate placement.

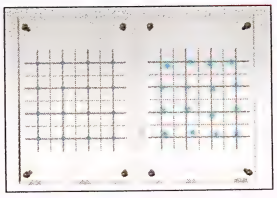


Special star shaped nozzles produce microscopic drops.

1,536 ink nozzles. There are 256 print nozzles per colour for a total of 1,536 on the print head, to help maximise throughput and resolve the conflict between speed and quality.





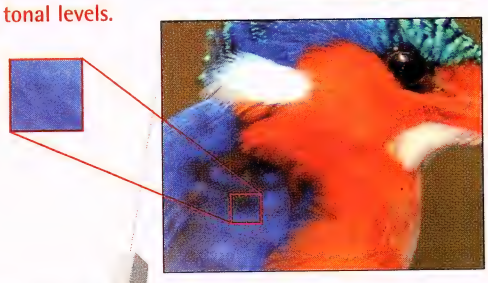


MICROFINE DROPLET TECHNOLOGY™

Accurate drop pattern.

SuperPhoto mode with 33 tonal levels.





1200 x 1200 dpi. This is necessary to produce a definition of 1,440,000 dots per square inch on any paper grade. But, "effective resolution" goes even further, almost beyond the ability of the human eye to discern tonal gradations.

SuperPhoto mode, 33-tonal levels. This is possible thanks to ultra-low, one-sixth density, six-colour PhotoRealism inks capable of 33 colour gradations per dot. This allows the SuperPhoto mode driver setting to deliver an unbelievable photographic reproduction on a special high grade paper.



Turn your printer into a scanner. An optional scanning cartridge delivers resolution up to 600 dpi.

Parallel and USB. Both interface ports are built-in for Windows® and Macintosh!

Canon Customer Care. The BJC-8200 features a one-year warranty upgradeable to three years for a minimal charge, and is backed by Customer Care info-line support. For more information call us on 1800 021 167.

Photo Realism™

New BJC™-8200 Colour BubbleJet™ printer – $749RRP

Canon

Price shown is recommended retail price including tax.Canon® and the Canon logo are registered trademarks and Bubble Jet, BJC, Microfine Droplet Technology, the Microfine Droplet Technology logo, PhotoRealism and the PhotoRealism logo are trademarks of Canon Inc.Windows® is a trademark of Microsoft Corporation in the US and in other countries. Macintosh and Mac are registered trademarks of Apple Computer Inc. 1. Printer driver support is provided for Windows® 95/98/NT 4.0 for the parallel port and pre-installed Windows® 98 and Macintosh OS.8.1 or later using the USB port. Canon Australia Pty Ltd ACN 005 002 951. CS9191

Studio PCTV

BY KIRE TERZIEVSKI

The Studio PCTV from Pinnacle Systems is a TV tuner card that lets you watch your favourite programs while you work on the PC. Since TV tuner cards have come down in price, they can certainly make a very worthwhile addition to your PC.

What really makes tuner cards so attractive is the ability to capture TV moments to your PC and play them back later. Inside the Studio PCTV box is a full version of Pinnacle's Studio video editing application. So now you can edit and save video captured from the TV and also create your own fascinating video clips, to which you can add effects, titles, voice over comments and audio.



Edit your own videos or save broadcast footage on your PC.

With the Studio PCTV you can record up to 384 x 288 from a television, camcorder or VCR. You can also just capture and save still images. In addition, the Studio PCTV can be upgraded to a Pro version which offers FM Stereo radio.

The Studio card delivers a smooth clear picture in a good-sized window. The Studio PCTV ships with plenty of applications that offer the various possibilities for capturing, editing and creating your very own video clips.

Studio PCTV

Price: Studio PCTV: $229, Studio PCTV Pro: $359. Minimum Requirements: PC system with 90Mz Pentium or compatible processor 50MB hard disk space Windows 95/98/NT4.0 Lakovision. Ph: 03 9852 7444; Fax: 03 9852 7400; www.lakovision.com.au

Keeping Count of Human Traffic

BY KIRE TERZIEVSKI

Traffic Pro is a people counting system developed for retailers and retail stores. The Traffic Pro system will record and analyse traffic information into hourly, weekly and yearly totals. It's the first step in getting to know more about your customers movement patterns and shopping habits. Over time you will appreciate how the Traffic Pro will help you understand your sales productivity and marketing effectiveness.

The counter is a fairly small device. It has four buttons located on top (Menu, >, <, Select) for menu selection. It has a built in rechargeable battery capable of providing power for approximately 50 hours (power adaptor also included). A RS-232 serial communications port connects the counter directly to the PC, two RJ-45 data communcation and two RJ-12 sensor input ports can also be found on the back of the counter recorder device. The Traffic Pro can store one year of hourly counts, with an option to expand the memory to store up to five years of hourly counts.

One of the most important steps in the installation process is to decide where you would like to place a sensor. Possible locations could be entry or exit doors, stairs or escalators. The location should really reflect the kind of information you want. The installation itself is easy. The counter can be placed in a back office or near a cash register. The cylindrical reflex sensor can be located about 30 metres (a 100-metre cable extension is also available) from the counter and is connected by cable to the RJ-12 jack. The sensor should be securely mounted to a flat surface 1.3 metres above the floor. The sensor has a 3-metre range (depending on the reflector used). Once the sensor is secured the counter is set to the "Sensor Alignment Mode" to help locate the sensor beam. The reflector (50 x 50mm) is then aligned directly opposite the sensor beam (the counter continually beeps until the sensor beam hits the reflector). A PC is then connected to the Traffic Pro counter via a RS-232 serial data cable.

The software installation wizard will help you set up quickly and efficiently. Once the setup is complete, you can familiarise yourself with the built in reports and corresponding graphs that help you with your analysis. There is a sufficient number of readily made available reports. You can however create your own custom reports. Some of the available reports include: Hourly, Daily, Monthly, Yearly and Average Traffic Reports. Reports can be just as easily converted into meaningful graphs that can be printed off.

The hourly traffic analysis will provide you with real time information about each counter for each hour of the day. Trend graphs may be used to view the traffic sustained over a period of time. You have all sorts of options made available to determine averages and rankings, and these can be exported to Microsoft Excel.

A highlight of this system which is truly worthwhile and accountable, is its ability to turn on air-conditioning once

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"Trinitron" is a registered trademark of Sony Corporation "AR.I Screen" (Anti-Reflection Treatment Screen) is a newly developed coating technology for CRT introduced by Sony Corporation.

a set number of people walk through your doors. The Traffic Pro system also supports directional counting, especially useful if you are only interested in the traffic coming in. (Note: Directional counting only works with Traffic Pro Directional Sensors.)

The Traffic Pro-Retail Edition can play a major role in helping you make retail management decisions. From understanding more about your customers shopping patterns and knowing the true effectiveness of your new advertising campaigns to solving customer traffic and store layout issues.

Traffic Pro-Retail Edition Customer Counting System.

Price $985. Traffic Pro. Price: $985. Ph: 08 8839 1122; Fax: 08 8379 1622; www.trafficpro.com

Go WebCam Go

BY JOHN McCORMICK

At first look, the device is a standard colour video camera. But unplug the USB cable and it becomes a digital camera. No, this is not a trick. It's the new **Creative Labs Video Blaster WebCam Go** ($319).

You can set the WebCam Go on any level surface and tilt the head as desired. The viewfinder doesn't indicate focus, but with a little practice you can get quality images. Push buttons let you select from single or multishot modes. The unit captures 90 640 x 480 JPEG images. Most still images require some software tweaking.

Default image settings worked reasonably well, which was fortunate; although the camera installed easily, the control software didn't work well on our tests. The WebCam Go's features include activation on motion and a time-lapse setting for uploading images.

The USB cable, control software, cloth case with belt loop, and two triple-A batteries (which last for about 300 images) are included with the WebCam Go.

The Creative Labs Video Blaster WebCam Go is no megapixel camera, but it is a good choice if you need both a Web camera and very low-end digital snapshot camera.

Creative Labs Video Blaster WebCam Go

Price: $319. Requires: Microsoft Windows 98 or NT; USB port. Creative Labs. Ph: 02 9666 6100; Fax: 02 9666 6900; www.australia.creative.com



The Creative Labs WebCam Go is a digital video camera, and still digital camera in one.

D-Link 5-Port Network Kit DFE-910

BY KIRE TERZIEVSKI

The D-Link DFE-910 is a network kit that allows you to connect 2 PCs into a 10/100Mb Fast Ethernet. The D-Link kit was designed for easy installation and high performance with the small network in mind. Inside the kit you will find two 32-bit PCI 10/100 Ethernet Network Interface Cards-with wake-on LAN, a 5-Port Auto-Sensing/Auto Negotiation 10/100 Ethernet/Fast Ethernet switch with segment switch and 100Mb Bridge network extender, two 6-metre CAT 5 network UTP cables, internet sharing software and two games (Diablo and Warcraft II). This kit truly represents great value for money considering its RRP of only $349.

The hardware setup is as easy as can be. A network cable running from the network card is simply routed to switch. The software installation was just as simple and straightforward. It was a matter of typing unique identifying names for each PC and a workgroup name that each PC will be a part of.

The two test machines were used to establish a peer-to-peer connection. PC-A was an Intel Pentium 733 with 64MB RAM and a 10.2GB Seagate HDD. PC-B was an Intel Pentium II 400, with 64MB RAM and a 40GB Maxtor HDD. The quick starter guide will pretty much get anyone who doesn't have any basic networking knowledge up and connected.

We ran a few file transfer tests on our small LAN. Peer-to-peer copies of a single 27MB file and 25.5MB folder containing 380 files were sent through NetBEUI. Our speed tests showed an average throughput of 2.4 Mbps. In the February issue of PC Magazine Australia we had a typical 10Mb Hardwired/ Ethernet NIC that was subjected under simular testing conditions. In that instance we managed an average throughput of 1.05Mbps.

The D-Link offers plenty in terms of speed and ease of setup. The DFE-910 is a serious network. We can really stand and applaud this networking kit that will suit any small office home office environment.



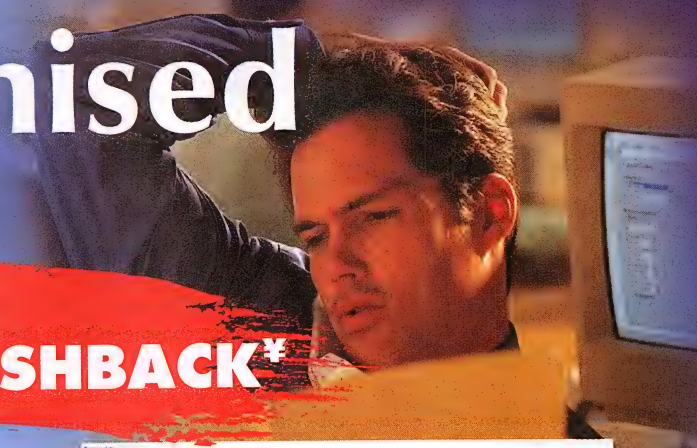
The D-Link DFE-910 Networking kit will suit any SOHO environment.

D-link DFE-910

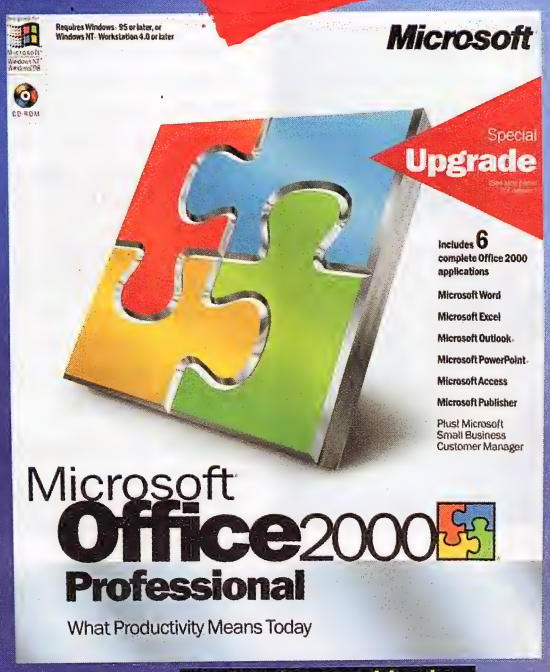
Price: $349. D-Link. Ph: 1800 177 100; Fax: 02 9417 1077; www.dlink.com.au

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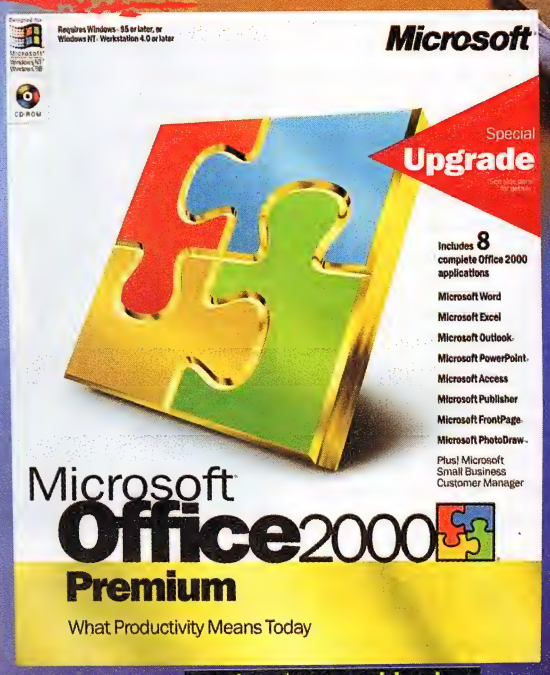


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Harvey Norman

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An LCD With TV

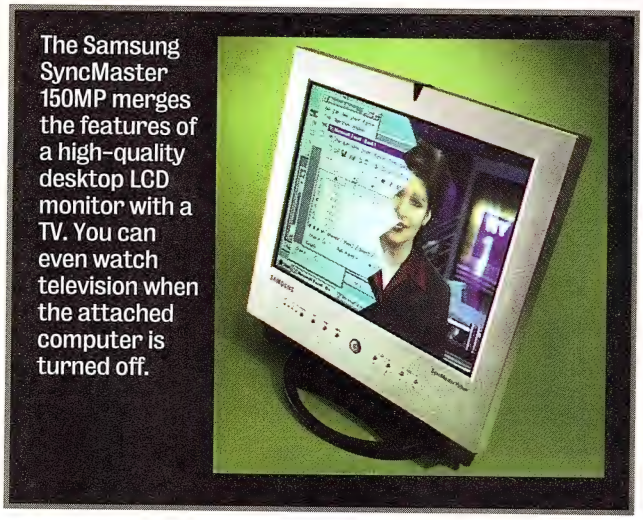
BY ALFRED POOR

If you're looking for one more reason to switch to an LCD monitor for your desktop, you've got one with the Samsung SyncMaster 150MP. In addition to an active-matrix, XGA, 15in LCD monitor, you also get a unit capable of displaying video and broadcast television at the same time. These extra features, however, come at a steep price.

You get an excellent display for the money you spend. The monitor's XGA images are sharp and stable, and the automatic image-adjustment feature effectively manages image position and signal synchronisation. We found only a tiny hint of pixel jitter in some images on our tests. Colour reproduction was accurate, with excellent colour tracking across all shades of grey.

The monitor comes with a convenient on-screen display (OSD) for the configuration controls. The icons are more detailed than the average OSD, and the menus are easy to use, with the soft-touch buttons on the control panel. The infrared remote control also makes adjusting the panel's settings easy. The monitor also comes with a colour-calibration utility.

The 150MP has a standard RGB signal input, two video inputs (composite and S-video), and an input for broadcast television (cable or antenna). You can display any of these sources as full-screen images, or you can choose any one of the video sources to display as a picture-in-picture (PIP) on top of the computer data display. You can watch these other sources even when the computer is turned off, which is one advantage over using a TV tuner card in your computer.



The Samsung SyncMaster 150MP merges the features of a high-quality desktop LCD monitor with a TV. You can even watch television when the attached computer is turned off.

The monitor does have a few shortcomings. The cable connections are bit cramped and difficult to reach, and the 150MP has only a single volume control, so you may have to adjust the volume as you switch between image sources.

Without a doubt, the Samsung SyncMaster 150MP delivers good image quality and looks great, but you pay a high premium for adding television to an LCD monitor.

Samsung SyncMaster 150MP

Price: $6995. Samsung Electronics. Ph: 02 9763 9700; Fax: 02 9763 5790; www.samsung.com.au

Micra Digital Fast Ethernet Kit

BY KIRE TERZIEVSKI

The Micra Digital PCI 10/100Mbps Fast Ethernet Kit has everything you need to get two computers connected. The pack includes 2 PCI (10/100 Mbps) network interface cards and one 5-metre UTP CAT 5 crossover cable. We put the Micra Digital network kit through exactly the same test cases the D-Link DFE-910 Network kit had gone through (see D-Link DFE-910).

Using the same two test machines we transfered the 27MB file and 25.5MB folder over our network through NetBEUI. We did not produce transfer rates that were any faster or even similar to what we had achieved with the D-Link DFE-910 kit. The Micra Digital kit on average managed a modest throughput of 1.8 Mbps. We then decided to connect the Micra Digital network cards to the D-Link 5-Port 10/100 Fast Ethernet Switch. As we had expected the Micra Digital network cards did not perform differently in any way.

The Micra Digital kit offers a simple way to start networking. If you are just getting into networking and only really need a peer to peer conection between two machines, this is what you should be looking to buy.



The Micra Digital Fast Ethernet Kit offers a simple way to start networking.

Micra Digital PCI 10/100MBps Fast Ethernet Kit

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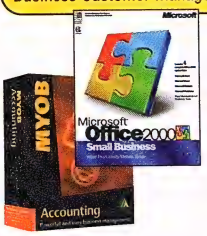
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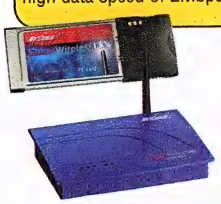
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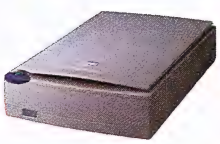


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WINDOWS

WAS IT WORTH THE WAIT?

In a word, yes—it was worth the wait. PC Magazine Labs has been testing Microsoft Windows 2000 for over a year, and we're very impressed with the scope and power of its new features. We're even more impressed with its stability; crashes have been exceedingly rare.

Specifically, the bigger your business or the more you're already using Windows NT, the more value there is in making the upgrade. If you're a small office, multimedia company, or game user, we advise waiting for the rest of the industry to catch up before embracing Windows 2000. We found upgrading existing Windows 98 systems to Windows 2000 Professional very tricky because of numerous hardware and software compatibility problems. Upgrading Windows NT desktops and notebooks was easier—but not without problems. For medium-size and large organisations, Windows 2000 provides valuable tools for building and expanding your e-business.

After years of claiming to have an enterprise-class directory service, Windows finally has, in Active Directory, one that can compete with the best of them. And Windows 2000 provides an impressive platform of Internet, intranet, extranet, and management applications that integrate tightly with Active Directory. You can set up virtual private networks—secure, encrypted connections across the Internet—with your choice of protocol. You can encrypt data on the network

WHAT TO EXPECT IF YOU...

...WORK AT HOME

Home-office users will like Windows 2000 Professional's interface, which resembles that of Windows 98. Upgrading from Windows 98 can be difficult, however, and your hardware and software may not work. Consumer home users are better off waiting for the Windows Millennium Edition.





...ARE ON THE ROAD

Remote users will find an improved environment for notebook computing, including Plug and Play, power management, and file synchronisation. You'll need at least 64MB of RAM and a 2GB hard disk, however, and Windows 98 users should watch out for hardware and software incompatibilities.



...RUN A SMALL BUSINESS

Small businesses will appreciate Windows 2000's reliable server and client OS, excellent security and backup, and flexibility for expansion. Many features require learning to use Active Directory, however, which may be daunting for this class of user.

2000

BY LARRY SELTZER

ILLUSTRATION BY HYEWON KANG

or on-disk. You can give users consistent access to the same files and objects from any network-connected PC. You can use the Windows Installer to distribute software to users over the LAN.

Unfortunately for many organisations, upgrading network systems to use Active Directory will require months of planning. Moreover, there is no undo command; adopting Active Directory is a one-way street. What this means in practical terms is that many shops will be operating in what Microsoft refers to as Mixed Mode (with some Windows NT 4 domains) for a while—able to take advantage of many of Windows 2000 features but not all.

Fortunately for individual users, the workstation version of Windows 2000, called Windows 2000 Professional, is actually easier to use than Windows NT 4 and has much better support for newer peripherals and mobile users.

Windows 2000 Server comes in three editions: Server, Advanced Server, and Datacenter Server, the last of which won't ship until mid-2000. The more advanced and expensive versions have support for greater numbers of processors and larger amounts of memory and have better high-availability features, such as load balancing and clustering.

In the following pages, we tell you the good and the bad of what we found.



...RUN A LARGER NETWORK

Medium-size and large enterprises need Windows 2000's enterprise-class directory, desktop management, security, application services, and strong Internet/intranet integration. A full upgrade to Native Mode using Active Directory, however, could take months or years—and there's no turning back.



...PROVIDE INTERNET SERVICES

Service providers will be attracted to Windows 2000's high-availability features and support for up to four processors and 64GB of memory (Datacenter will support 16 processors and 64GB of RAM).

INSIDE:

WINDOWS 2000 PROFESSIONAL
(Client OS)
Page 66
THE VERDICT: Fast, stable, mobile; difficult upgrade.
OUR RATING: ●●●

ACTIVE DIRECTORY
Page 68
THE VERDICT: True enterprise directory; complex migration.
OUR RATING: ●●●

MANAGEMENT
Page 70
THE VERDICT: Excellent desktop management; could be better integrated.
OUR RATING: ●●●●

FILE AND PRINT
Page 70
THE VERDICT: Everything's there; Windows has caught up with NetWare.
OUR RATING: ●●●●●

APPLICATION SERVICES Page 72
THE VERDICT: Reliable, scalable, highly available.
OUR RATING: ●●●●

INTERNET INFRASTRUCTURE
Page 74
THE VERDICT: Good extranet platform.
OUR RATING: ●●●●

SECURITY Page 76
THE VERDICT: Much more secure than Windows NT 4.
OUR RATING: ●●●●

SETUP AND MIGRATION Page 78
THE VERDICT: Easy setup, difficult migration.
OUR RATING: ●●●

PERFORMANCE
Page 80
THE VERDICT: Faster server; desktop equivalent to Windows NT 4.
OUR RATING: ●●●●

OVERALL RATING
THE VERDICT: A great improvement.

WHAT THE RATINGS MEAN

●●●●● – EXCELLENT
●●●● – VERY GOOD
●●● – AVERAGE
●● – FAIR
● – POOR

Windows 2000 Professional

rating ●●●●●

Windows 2000 Professional, the desktop part of Windows 2000, is more stable, more secure, and easier to use than Windows NT 4 Workstation. It's not an obvious upgrade for every system, but medium-size and large enterprises should strongly consider Windows 2000 Professional for new systems. And unlike Windows NT 4, Windows 2000 Professional is a great notebook OS. For the average home or home-office user—or the less savvy small-business user—Windows 2000 Professional is still a little too large and too complex compared with Windows 98.

Windows 2000's user interface closely resembles that of Windows 98, with a few new bells and whistles thrown in. For example, the new Personalized Menus feature tracks your use of the interface and hides options in the Programs list that you have not used recently. You can see the hidden options by clicking on a double arrow at the bottom of the menu.

Windows 2000 also includes all the goodies that come with Internet Explorer 5, such as the ability to drag items directly to, from, and within the Start and Favorites menus. You can shut off parts of the default interface, such as the Quick Launch bar next to the Start button.

FINALLY, A NOTEBOOK OS

One stellar leap for Windows 2000 ahead of Windows NT 4 is notebook support. Like Windows 98 Second Edition (SE), Windows 2000 supports power management on hardware with BIOS support for ACPI (Advanced Configuration and Power Interface), a power-management specification that lets the PC control power to peripherals and vice versa.

Our BatteryMark tests did not show improved battery life compared with Windows NT 4. Contrary to popular belief, ACPI will not give you noticeably improved battery life according to Microsoft and Intel. Like Windows 98, Windows 2000 also supports Plug and Play (PnP), including the hot-swapping of PC Cards.

Our favorite new feature is the Synchronization Manager. By marking a file or folder as available off-line in Windows Explorer, a user can continue to work on it when not connected to the network. When connected, the Synchronization Manager replicates any changes in the files to the network.

The Encrypting File System (EFS), new to Windows, makes it easy to encrypt files on disk, providing an extra measure of security for stolen notebooks (a topic discussed further in "Security," page 82).

Microsoft has vastly increased the number of types of hardware supported by Windows 2000 to include DVD drives, Universal Serial Bus (USB) devices, Accelerated Graphics Port (AGP) graphics, certain multifunction adaptors, and PC Cards. As with Windows 98, Plug and Play hardware supported natively by Windows 2000 should install itself. When the OS detects new PnP hardware in the system, it identifies the hardware and offers to install the drivers. You have the option of installing the drivers from the Windows 2000 installation media, a floppy disk, a CD-ROM, or the Windows Update site. With non-PnP hardware, such as old Sound Blaster cards, you may have to run the Add New Hardware wizard. We had mixed success with both hardware and software after upgrading several desktops and notebooks, but you can expect third-party vendors to provide patches and driver updates for Windows 2000 on their Web sites. An inexperienced user may not make it through an upgrade, particularly from Windows 98. (For more detail, see "Setup and Migration", page 86.)

The Network Neighborhood folder in Windows NT 4 and Windows 98 has been replaced by one called My Network Places, which has a different layout. A new wizard called Add Network Place makes connecting to network resources, such as shared drives and printers, easier. You can also see and select FTP servers, Web servers, and other resources that use the WebDAV protocol.

You can use a Windows 2000 Professional system as a shared Internet connection. The Internet Connection Sharing (ICS) feature, first released in Windows 98 Second Edition, connects you to the Internet and uses the Network Address Translation (NAT) protocol to share a single IP address.

You'll also notice that many Windows NT administration features have moved

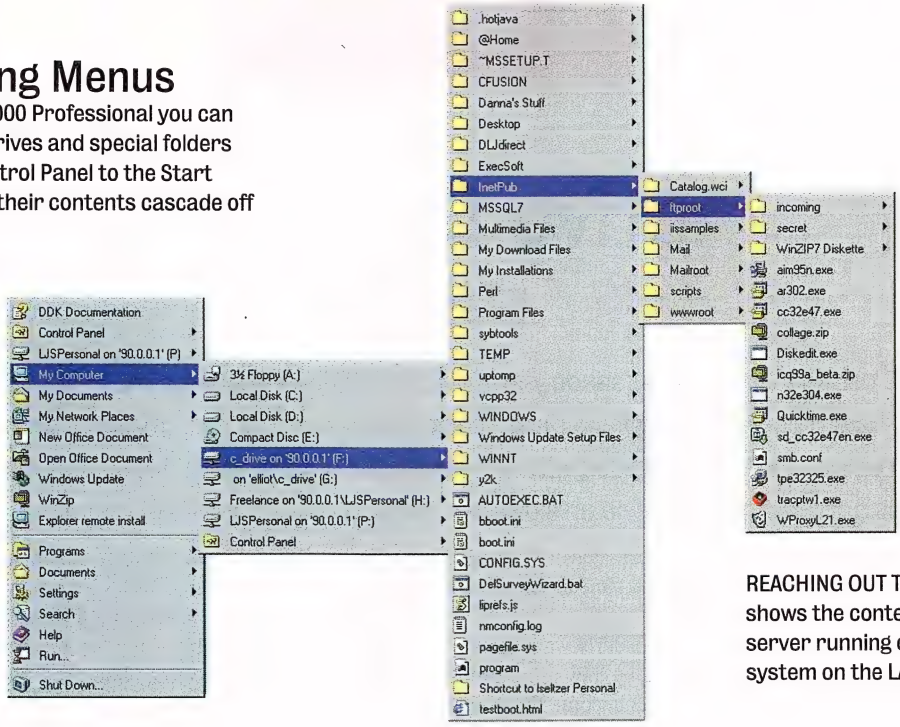
The Good, the Bad, And the Upgrade

Here are some of the highlights of our upgrade experience.

- Microsoft Office 95 applications worked well, as did Corel WordPerfect and Quattro Pro, holding onto custom toolbars and dictionaries.
- A Dell Pentium III/550 system upgrade from Windows NT 4 with MSDN, SQL Server 7.0, Office 2000 Developer Edition, Borland C++ Builder 4, JBuilder 3, and Interbase 5.5 worked very well.
- Upgrading an IBM 300PL from Windows NT 4 resulted in nonfunctioning audio devices.
- After an upgrade from Windows NT 4, a Toshiba Portégé 7100 notebook's RingCentral dialler/fax no longer worked.
- Upgrading a Dell Latitude CS resulted in a nonfunctioning Smart and Friendly Pocket CD-RW drive.
- A Linksys USB-to-Ethernet PC Card did not survive a Toshiba Satellite 4015CDS upgrade from Windows 98.
- The nVidia GeForce 256 driver on a Dell Pentium III/800 gaming machine did not provide hardware acceleration after the upgrade from Windows 98.

Cascading Menus

With Windows 2000 Professional you can drag network drives and special folders such as the Control Panel to the Start button and see their contents cascade off the menu.



REACHING OUT The last menu shows the contents of an FTP server running on another system on the LAN.

around. Almost all administration is performed through the Control Panel.

LEGACY HARDWARE: MAYBE

Hardware requirements are one of the main reasons Windows 2000 may not be the right system for all legacy desktops and notebooks. Microsoft lists 64MB as the recommended RAM requirement, but raising RAM to 128MB greatly improved performance in our tests. Windows 2000 also requires 650MB of hard disk space for installation. A 2GB hard disk should be adequate.

One stopgap alternative to a massive hardware upgrade for certain networked legacy systems might be found in Windows Terminal Server, a Windows 2000 feature that puts all the applications and power on a server and uses the client machine simply as a display and input device with a network connection.

Microsoft maintains an updated list of hardware it knows is compatible with its various operating systems at *www.microsoft.com/hcl/* and a list of Windows 2000–compatible hardware and software at *www.microsoft.com/windows/professional/deploy/compatible/default.asp*. If you have Windows 2000, you can run the setup program (Winnt32.exe) with the /checkupgradeonly switch and get a report detailing unsupported hardware and software on the system.

Windows 98 versions of programs that require direct access to hardware, such as antivirus software and several games, will not work under Windows 2000. Windows NT versions, if they exist, will work, however. You'll also have problems with programs with certain bugs that Windows 98 tolerates better than Windows NT. Pay special attention to all utility software and device-control software, such as proprietary scanning programs.

Despite upgrade hassles, Windows 2000 Professional is a worthy operating system for most business users. —*LS*

Should You Upgrade?

Here are some pros and cons to help you decide if you should make the switch from your current operating system to Windows 2000.

FROM WINDOWS 98

PROS

- Better stability and reliability
- Better performance
- Better data security
- Better device drivers
- Similar interface
- Plug and Play
- Supports DVD, USB, IEEE 1394, PC Cards, DirectX 7.0
- Equivalent support for the mobile user

CONS

- Upgrade can be difficult
- Fewer peripherals supported
- At least 64MB RAM required
- More complex system with more options

FROM WINDOWS NT 4 DESKTOP

PROS

- Better stability and reliability
- Better performance
- Better data security and backup
- Smart-card support
- Plug and Play
- Support for DVD, USB, IEEE 1394, PC Cards, and Direct X 7.0
- Better mobile user features
- Better VPN client

CONS

- Administration of some system features has changed, requiring retraining
- Increased hardware requirements
- Not as much support for older notebooks

FROM WINDOWS NT 4 SERVER

PROS

- Better reliability
- Enterprise-class directory with LDAP support
- Better DNS and DHCP support
- Leverage of Interenet/intranet features via Active Directory
- Better data security
- Better desktop management
- High availability features
- Improved File and Print
- Improved performance in multiprocessor systems
- Integrated hierarchical storage management

CONS

- Increased complexity
- Many features require Active Directory
- Full migration to Native mode requires extensive planning and conversion of all Windows NT 4 servers to Windows 2000

Active Directory

rating ●●●●●

Active Directory may be the reason you switch to Windows 2000—or the reason you don't. Windows NT 4—based enterprises will be pleased that Windows NT's flat, unwieldy domain structure has been replaced in Windows 2000 with a true hierarchical, distributed directory service for managing resources across an enterprise or extranet. Windows2000's Internet, security, and management

features integrate tightly with Active Directory, as will Microsoft Exchange 2000 (Microsoft's messaging product) and several other third-party applications.

Directory services are nothing more than orderly ways of classifying and managing resources on a network, be they users, printers, servers, or security parameters. Directories become the points of reference for applications and user services. They help find a printer in a field office, locate a user and direct an e-mail, or verify that a user has access rights to a particular file. They also provide single sign-on, which gives a user access to the whole network from a single log-on. Directories are becoming increasingly important as business networks expand to include connections with business partners and customers.

When compared with other enterprise directories, such as Novell's Directory Services (NDS), Active Directory has its pluses and minuses, but it's a vast improvement over Windows NT 4's domains. Managing a single directory for multiple functions greatly reduces cost and complexity. And Microsoft has a good chance of seeing third-party applications integrate with Active Directory. Microsoft created the Active Directory Service Interface to rally third-party application support.

CAN YOU GET THERE FROM HERE?

The problem, for now, is getting there. Our testing showed that moving a large organisation from domains to Active Directory requires extensive planning and testing. First you have to design a workable hierarchical directory structure—not an easy task. Then you must decide how all your Windows NT 4 domains will fit into the new structure and who will manage it. In large organisations, this can be as much a political problem as a technical one.

In order to switch to what Microsoft calls Native Mode, which means that all your domains are integrated with Active Directory, Windows NT 4 shops will have to upgrade all of their Windows NT 4 domain controller servers to Windows 2000. Then they can use Microsoft's licensed version of Mission Critical Software's Domain Migrator, called Active Directory Migration Tool, or a third-party utility, such as FastLane Technologies' FastLane (*www.fastlanetech.com*) to reconfigure their domains. These programs have drag-and-drop interfaces and automatically move users and groups among domains as necessary.

Most NetWare-based organisations will not find good reasons to switch to Active Directory, unless they plan to abandon NetWare completely. If you do decide to make the switch, you will most likely begin by creating new domains, and then move objects from one directory to another a bundle at a time. Microsoft provides automation tools to handle directory migration on its Microsoft Services for NetWare 5.0. We suggest you create a test-bed and build expertise before trying it for real. You may use Active Directory in addition to NDS if you're running Windows 2000-based server applications such as Exchange.

Since every Active Directory domain uses a Domain Name System (DNS) name, some companies will find it useful or necessary

YOU NEED ACTIVE DIRECTORY FOR...

- **Intellimirror**
- **Remote Installation Services (RIS)**
- **Delegation of administration**
- **Multimaster Replication**
- **Global Catalog**
- **Kerberos**
- **Two-way transitive trust**
- **Smart cards**
- **Quality of service (QOS)**
- **File Replication Service (FRS)**

YOU WANT ACTIVE DIRECTORY FOR...

Security groups Enables groups spanning more than one domain or nested in other groups.

Domain Name System (DNS) Provides one replication topology for AD and DNS.

Dynamic Host Configuration Protocol (DHCP) Stores records of authorised DHCP servers.

Routing and remote access Stores remote-access permissions and policy.

Virtual private network (VPN) Provides strong encryption and smart-card authentication.

IP Security (IPSec) Used to publish public keys and apply IPSec group policies.

Distributed File Services (DFS) Clients can locate most local servers.

Encrypting File System (EFS) Used for certificate validation and defining EFS recovery policies.

Print services Users can search for printers by attribute.

Internet Information Server (IIS) Provides advanced authentication methods, such as certificates.

Group Policy Can define policies for sites, domains, and organisational units.

Certificate Server Can assign, manage, and revoke certificates.

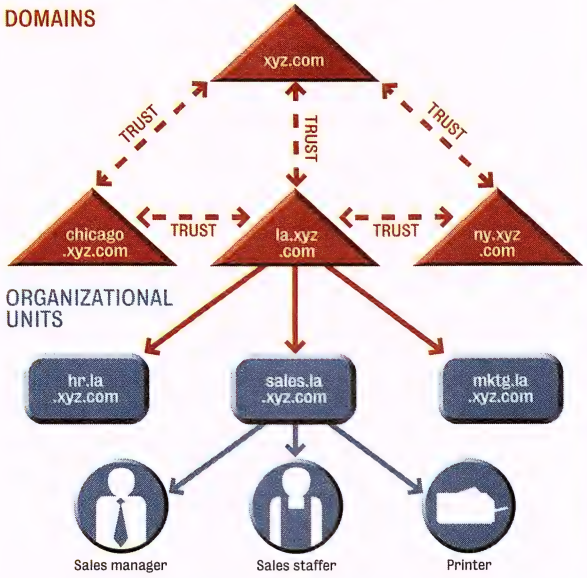
Message Queuing Service Stores configuration and status information.

to reconfigure their existing DNS infrastructure to match their Windows 2000 domain structure. Others will use a feature called Zone Delegation to register the new Windows 2000 DNS system into their existing DNS systems, handing off DNS requests to the Windows 2000 DNS server where appropriate.

We expect that most organisations will spend months planning before changing to Active Directory. In the meantime, Active Directory can coexist on a network with Windows NT 4 domains in what Microsoft calls Mixed Mode, replicating information to Windows NT 4 domains using the traditional flat format that they understand. Several features, including Internet Information Server and DNS and DHCP servers, work fine in Mixed Mode. To get the full benefit of Windows 2000's new management, remote-access, and security features, however, you must use Native Mode.

How Active Directory Works

Active Directory arranges domains in a hierarchy and sets up two-way transitive trust relationships among all the domains in the tree. Domains are broken down into organizational units that contain users, groups, and network resources. Domains and organisational units use DNS naming conventions.



PEACEFUL COEXISTENCE

Novell's NDS has versions available to manage Linux, Macintosh OS, and Windows 3.1 clients; Windows NT 4 and Sun Solaris servers; and even mainframe operating systems. For now, Active Directory is only available for Windows-based clients and servers. In a partnership with Microsoft, Cisco plans to port Active Directory to Solaris and HP-UX—but not until at least six months after Windows 2000's release. For networks with both NDS and Active Directory, Microsoft provides Directory Synchronization Services for synchronising changes in Active Directory with NDS and vice versa. Microsoft's acquisition of Zoomit will lead to metadirectory features. For example, deleting a user within Active Directory would also remove the user from NDS, SAP R/3, and the mainframe.

ACTIVE DIRECTORY STRUCTURE

As part of its efforts to Internet-enable Windows 2000, Microsoft has built AD on two Internet standards: DNS, the standard for naming and locating domain names on the Internet, and LDAP Version 3, an Internet Engineering Task Force standard for exchanging directory information with clients and other directories.

Active Directory arranges domains in a hierarchical, treelike structure that, like Novell's NDS, more accurately reflects the structure of most organisations (see the diagram "How Active Directory Works"). All objects in a tree share a common DNS namespace. Unlike Windows NT's domains, Active Directory can further subdivide domains into organisational units that contain other units or leaf objects, such as users, printers, and so on. If necessary, a company can create more than one tree (say, in a merger situation), or a forest.

Trusts give user and group rights to traverse domains and are essential for single sign-on. In Active Directory all domains in a tree are automatically joined through a two-way, transitive trust (meaning that if domain A trusts domain B, and domain B trusts domain C, then domain A trusts domain C and vice versa). These are created using Windows 2000's Kerberos security infrastructure (for more, see "Security", page 82). This significantly reduces the complexity of maintaining trusts (they had to be manually configured in Windows NT 4). We were also pleased to find that Active Directory lets the administrator delegate administrative authority down to the Organizational Unit level, as opposed to Windows NT 4, which could only delegate to the domain level. So you can set more restrictive access to your human resources department Organizational Unit or domain than to the sales Organizational Unit or domain, for example. Administrative rights do not cross domain boundaries, but rights granted to one Organizational Unit in the domain hierarchy can be inherited by all subordinate Organizational Units of the tree.

In contrast to NDS, user rights to other domain objects or common resources such as file servers cannot be assigned to an Organizational Unit. Rights must always be configured for individual users and groups. This can get complicated when there are lots of moves and changes.

Each domain has at least one Domain Controller, a server that contains directory information and responds to database requests or routing requests for resources. Windows NT 4's Primary and Backup Domain Controllers have been replaced in Windows 2000 by a peer model, in which any server can be promoted to Active Directory domain controller status without having to reinstall the OS. Multimaster Replication replicates changes made to any single controller to all other controllers.

In order to reduce the latency involved in routing requests to domain controllers across slow links, Active Directory also makes use of global catalogue servers, which contain information about every object in the directory, though they store only the attributes that are most often requested.

To conserve bandwidth in slow connections, Active Directory only replicates changes, not entire objects. Active Directory also lets you regulate replication across slower WAN connections.

Scalability is one of Active Directory's principal improvements. For example, NDS partitions are limited to 1000 objects, but Active Directory's can hold millions of objects and use indexed data stores.

Active Directory will help clinch Microsoft's place in the enterprise. —*David Linthicum*

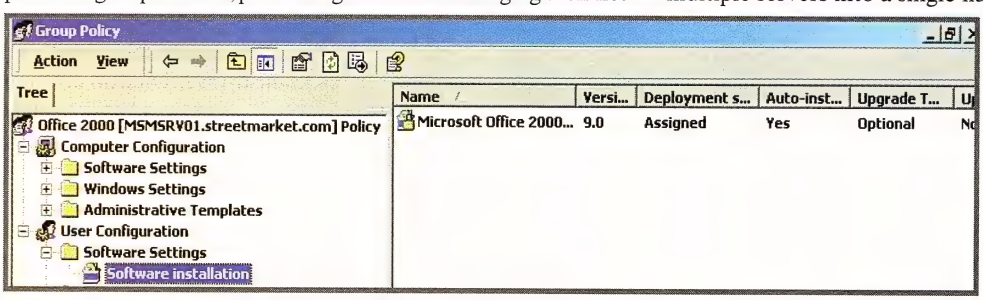
Management, File and Print

rating ●●●●● rating ●●●●●

Windows 2000 brings Windows' file and print capabilities up to the same level as NetWare's. Perhaps more compelling for large Windows NT–based organisations (500 or more users), however, are the management features Microsoft has added to reduce the total cost of ownership (TCO) of desktop PCs. Novell offers similar capabilities in NetWare and ZENworks, and Microsoft has offered many of these features in its desktop management product, Microsoft SMS, for years. You may want to consider these alternatives, as most of Windows 2000's TCO-reducing features work only with Windows 2000 clients and servers and Active Directory.

GROUP POLICY AND INTELLIMIRROR

Group Policy gives administrators far-reaching control over desktop and notebook computers on the network. It can be used to limit users' access to system files, desktop settings, and applications. For example, we removed access to the Network Control Panel applet for a group of users, preventing them from changing their network adaptor settings or adding and deleting protocols and services. Such measures can save hours of time spent fixing user-created problems.



REMOTE CONTROL The Group Policy editor lets you control client user settings and deploy software to both individual users and PCs.

REMOTE INSTALL Define a group policy, such as a software installation, and the action takes place when the user logs on.

We had heard a lot about Intellimirror but found it confusing at first, because it's not a single utility but a collection of applications. With Intellimirror, users can access their data, applications, and settings from any PC on the network; this is practical for users who travel among branch offices or in cases where users' PCs have to be replaced quickly. Notebook users can access their data even after they disconnect from the network. It was easy to redirect the My Documents folder on a desktop PC to a network location and set up off-line access.

Intellimirror lets you associate specific applications and desktop settings with users. When a user logs on to a new PC, the Windows Installer utility downloads and installs a copy of the user's associated applications if necessary. You can store settings, such as the background colour of the desktop and IE Favorites, on the network, and they will follow the user to any network PC. Finally, you can set up self-healing applications; if a user accidentally deletes a necessary application file, Intellimirror downloads it the next time the user launches the software.

FILE AND PRINT BASICS

With Active Directory, the administrator can set up disk quotas for users and groups—a storage-saving feature that has been standard in NetWare for several years. The administrator can map a drive letter to a single server subdirectory and can control access down to the file level.

The Distributed File System (DFS) lets you combine data on multiple servers into a single name. This is especially useful for large database applications that need to pull data from multiple locations. It was easy to create a dataset and distribute it across several different servers.

Many of the new print-related features require Active Directory. One of these, the automatic printer driver installation, lets you preinstall drivers for all of your printers on the network. If a user sends a print job but the user's PC lacks the correct drivers, Windows will automatically push them down to the client. This works very well with the printer-search capability of Active Directory, which lets users look for a printer based on attributes such as colour printing or paper-handling features. Windows 2000 supports the Internet Printing Protocol, so users can print across the Internet by entering a DNS or IP address.

BACKUP, RAID, AND STORAGE

A built-in backup utility codeveloped by Seagate and Veritas provides excellent storage management, including a scheduler and support for many tape devices.

Remote Storage Management (RSM) lets you off-load data that hasn't been accessed in a set period of time to tape or disk. Although this feature is powerful, we found its Microsoft Management Console interface a little confusing.

An improved software RAID controller is included as well. It works with Levels 0 through 5 and even allows level changes on the fly without rebuilding the array. —*Steve Rigney*

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No Ball Mouse with Scroll Wheel



This is an innovative new mouse is compatible with the Microsoft IntelliMouse. It uses a new technology that avoids the need for a mouse pad, as there is no ball to gather dust. The mouse will even work on glass. A RISC 8 bit 12MHz CPU module decodes the movement to provide a resolution of 625 dpi. The smooth and continuously scrolling wheel provides better micro positioning than standard gear type scrolling wheels.

Cat. 8784 **Mouse with Sroll Wheel & No Ball** $79

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Ideal for any Point-of-Sale situation, this robust, 115 key programmable keyboard supports 2 x 20 line text or 160 x 32 graphic LCD and has a magnetic swipe reader built-in. It has both PS/2 and RJ-45 connectors, modelock with five keys & seven positions and programs 8 characters per key.

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This sophisticated controller allows one keyboard, monitor, mouse to control 2 PCs. Single DB25 connectors on the controller and multi-core extension cables allow for simple connection (2 x PS2 cables supplied). Auto scan and manual selection (key strokes or switch) of the PCs is provided.

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Cat. 2315	**Bi-directional 2 Port**	$61
Cat. 2316	**Bi-directional 3 Port**	$97
Cat. 2235	**ECP/EPP 1 Port**	$65
Cat. 2236	**ECP/EPP 2 Port**	$69

Also available, are Plug & Play PCI printer cards.

Cat. 2618	**1 Port Printer PnP PCI**	$79
Cat. 2687	**1 Port ECP/EPP/SPP PnP PCI**	$83
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All-in-one: Internet Access / Email / Print / Fax Server + 7 Port UTP 10 /100Mb Hub



An internet access server combined with a 10/100 ethernet hub with 7 ports and 1 uplink port as well as a printer server, a fax server and a virtual email server, all in one box. There are two RS232 ports to provide additional bandwidth to the Internet. Up to 253 users on the network can have simultaneous access to the Internet. A hardware-based firewall ensures security, while dial on demand minimises connect time. It also has a built in DHCP server.

Cat. 10118 **Internet Access / Fax / Print / Email Server & 7 Port UTP Hub 10/100Mbps** $699

VGA Surveillance Monitoring Hub



Plug in up to six cameras and display them on a PC monitor. Video recording can be configured to turn on with motion detection. Captured video can be compressed and stored on the hard disk and time and date stamped. The unit can be monitored or controlled remotely with individual camera control. The included software runs under Win95 or 98.

Cat. 3410 **Video Surveillance Monitoring Hub** $2349

Intelligent Network tester with LCD Display



An intelligent continuity tester for LAN cables that saves time on the job. It tests a range of Modular cables including 10Base-T (Category 3-5). Four numbered remote terminators allow testing, tracing and identification of in situ cables. The LCD display shows the pin connections as well as the wiring scheme detected.

Cat. 11518	**Intelligent Network Tester**	$229
Cat. 11519	**Network Tester with LCD**	$239

Hot Swap IDE Mobile Rack HDD Kit



The Mobile Rack is the perfect solution for data backup & transporting data between computers. The kit consists of a 5.25" mounting rack and a removable tray for a 3.5" hard disk and simply mounts in a standard 5.25" half-height bay. The tray can be easily removed so data can be taken off site or locked in a safe for security purposes. Move data between home and office or swap easily between multiple operating systems. The hot-swap model has a software utility, which enables you to remove & replace the drive in the PC without having to reboot or shut down your system.

Cat. 6614	**Mobile HDD Kit IDE Hot Swap**	$159
Cat. 6610	**Mobile HDD Kit IDE**	$69
Cat. 6611	**Mobile Rack IDE Tray Only**	$39
Cat. 6615	**Mobile HDD Kit IDE Ultra DMA**	$89
Cat. 6612	**Mobile HDD Kit SCSI**	$79
Cat. 6613	**Mobile HDD Kit SCSI Wide**	$129

Hot-Swap IDE RAID Array



Avoid downtime delays when your hard drive fails! This unit enables the user to replace the hard disk while the PC is operating and it automatically resynchronizes itself to full operation. The RAID unit fits into two continuous 5.25" bays and includes a controller and two removable frames. The array accepts two EIDE, Ultra DMA 66/33 or PIO 4 hard drives. The controller provides RAID Level 1 disk mirroring. It can also be used as an on-line hard drive copier.

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Application Services

rating ●●●●●

Windows 2000 provides better scalability and high-availability features for running large enterprise and Internet applications than Windows NT 4. We predict, however, that for at least another year the traditional high-end Unix platforms, such as Sun Solaris and HP-UX, which have features similar to Windows 2000, will continue to dominate. The chief competition will come from

Windows 2000 Datacenter Server, which Microsoft plans to ship in mid-2000.

For the lower-end application developer deciding between Windows 2000 and Linux, the differences are not substantial. Both provide memory protection and virtual-memory management, and both support large-memory models—2GB with Linux and 8GB with Windows 2000 Advanced Server (64GB with Windows 2000 Datacenter). Both also offer process scheduling and SMP support: up to 16 processors for Linux and up to eight processors for Windows 2000 Advanced Server (up to 32 for Datacenter). Linux provides operating-system source code, but most organisations will not mess with the code.

There are hundreds of application-development tools available for the Windows 2000 platform, but only a few currently available for Linux, though this market is growing rapidly.

In our tests, Windows 2000 was stable for traditional application-processing using a single server. This included processing new COM+ applications and older Visual Basic applications. We set up a few unruly programs (such as one that writes to a null pointer) and watched them execute and fail, but the operating system kept on trucking. Windows 2000 was also slightly faster and more scalable than Windows NT 4.0 (see our ServerBench 4.1 test results, page 87).

GOT TO SCALE

Windows 2000 Server comes in three sizes: Standard Server Edition, Advanced Server, and the big gun: Windows 2000 Datacenter Server. Advanced Server supports eight symmetrical processors and 8GB of memory. This product will find its niche in medium-size companies or organisations running an application-processing load of 100 to 500 users or with fairly busy Web or e-commerce sites. Windows 2000 Datacenter will take up to 64GB, and the 32 processors it supports will probably accommodate 1000 simultaneous users with high application-processing demands.

Windows 2000 Advanced Server and Datacenter Server come with two essential high-availability features for medium-size and large Web sites, and Microsoft's upcoming AppCenter will provide a third. For Web server farms, there's Web server load balancing, supporting up to 32 functioning servers in a cluster. Called NLB (Network Load Balancing), this kind of load balancing distributes IP requests to the most available Web server in the cluster. It also provides fail-over and the ability to swap servers in and out without interrupting service. We found that NLB is limited to processing stateless events, such as simple read-only Web-page file service.

Simple two-server fail-over (four-server fail-over in Datacenter), in which one server takes over processing when another crashes, is provided through Microsoft Cluster Server (MSCS) and is a good fit for back-end database processing. All hardware used with Windows 2000 MSCS must pass a hardware compatibility test (HCT), so check with Microsoft before putting your legacy servers to work.

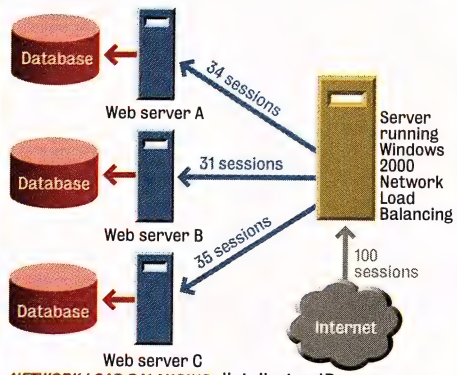
Component-Dynamic Load Balancing will appear with Microsoft AppCenter later in 2000. It will support up to eight connected application servers, providing the application developer with the ability to process one or many COM+ components across a cluster.

Thus, a three-tier Web site could use NLB for the Web servers, Component-Dynamic Load Balancing for the application servers in the second tier, and fail-over for the back-end database servers.

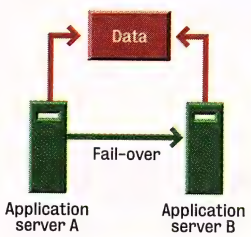
The complete package of Windows 2000 Advanced Server, Datacenter, and AppCenter will rival the performance and scalability of much costlier systems. —*DL*

High Availability in Windows 2000

Windows 2000 Advanced Server offers two high-availability features, Network Load Balancing and Cluster Services.



NETWORK LOAD BALANCING distributes IP connections to the most available servers in a bank of up to 32 Web servers, letting Web sites scale to high user and processing loads.



With **CLUSTER SERVICES**, when one server in a cluster fails or is taken off-line, the other server takes over the operations of the failed server. Windows 2000 Advanced Server supports two-node clusters. Windows 2000 Datacenter will support four-node clusters.



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Internet Infrastructure

rating ●●●●○

Windows 2000 can come much closer than Windows NT 4 to carrying Internet, intranet, and extranet connectivity throughout your organisation. It can handle just about any type of connection, from ATM to wireless, and provides excellent security. Its capabilities are similar to those of Novell's NetWare, but the popularity of Windows makes deployment and management less

arcane. We especially like the Microsoft Management Console (MMC) wizards, which can help with network setup tasks.

REACHING OUT SECURELY

We predict that the improved VPN (virtual private network) service found in Windows 2000 will be one of its most influential features. VPNs provide remote access and site-to-site connections via encrypted tunnels across the Internet, saving money on long-distance calls and leased lines and enabling secure connections among extranet partners. Microsoft has added support for the secure and widely used IPSec protocol in its VPN client, making VPN deployment, especially with third-party products, easier. Microsoft still offers the Point-to-Point Tunneling Protocol (PPTP) for companies that don't want to manage a public-key infrastructure and don't need the high security of IPSec.

IPSec VPN service encrypts TCP/IP traffic using powerful DES or triple-DES encryption and uses public-key encryption to establish authentication. Windows 2000 Server also includes the Layer 2 Tunneling Protocol (L2TP), which is used by many third-party products, in both the VPN client and server. If your network carries legacy NetBEUI or IPX traffic, L2TP can encapsulate those protocols within secure IPSec-encrypted TCP/IP packets for passage across the Internet. Perhaps the best feature is tight integration with Active Directory, which makes management less complicated than it is with other products.

The Remote Access Services (RAS) are a way to give employees within a local calling area access to the corporate LAN. If you have installed Active Directory, an ISP can use RADIUS (Remote Authentication Dial-In User Service), an access control protocol linked to Active Directory, to give clients a single log-on to the ISP's service and the corporate VPN. In the future, this function will provide a way for the ISP to offer special services to individual users dynamically.

Windows 2000 also includes router software and support for quality of service (QOS) features that would be practical in a small office or branch office. Today, QOS in Windows 2000 is a set of application program interfaces for developers, but when applications such as telephony ask for low delay or wide bandwidth, your Windows 2000–based router will understand the request.

BUILDING BASIC CONNECTIONS

You can make several changes to the configuration of a LAN or WAN adaptor without having to reboot. There's also a feature called Automatic Private IP Addressing (APIPA) that takes a lot of the strain out of setting up small IP networks. APIPA's functions include IP network address translation (IP NAT), so you don't have to beg your ISP for routable IP addresses to use inside your LAN.

In case you need routable IP addresses inside your LAN, Windows 2000 includes a DHCP server, with excellent management features that report on how addresses are used, and a DNS server. Domain names on Windows 2000 Server are DNS names when Active Directory is running. The DNS in Windows 2000 is an implementation of the draft IETF Dynamic DNS standard. Active Directory uses Dynamic DNS, which lets you give fixed names to resources, even though they get dynamic IP addresses, thus shrinking the pool of fixed IP addresses you have tied up.

Though we were impressed with the DNS, we did have to disable another active DNS server on our test LAN to avoid a lot of error messages during start-up. You should establish an isolated subnetwork when first bringing up the DNS.

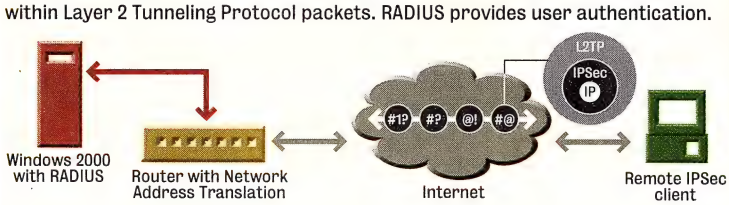
Microsoft delivers a comprehensive bundle with the building blocks for a flexible, reliable, and secure intranet or extranet operation in organisations of all sizes. —*Frank J. Derfler, Jr.*

Virtual Private Networking

You can use Windows 2000Õs Connection Manager and Administration Kit to distribute e-mail attachments containing VPN client software configured for your companyÕs VPN connections.



IPSec client software connects the remote user to the corporate VPN server via an encrypted tunnel across the Internet. In order to get past a server or router with Network Address Translation, IPSec packets can be further encapsulated within Layer 2 Tunneling Protocol packets. RADIUS provides user authentication.



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Security

rating ●●●●●

Networks and individual systems can be far more secure under Windows 2000 than under Windows NT 4. Financial institutions and other organisations or departments with strict security requirements will find much of what they need in the new operating system. Making full use of Windows 2000 security, however, means embracing Active Directory and requires considerable management attention and significant training.

Authentication—determining that users are who they claim to be—has undergone an overhaul in Windows 2000. If you decline to take on Active Directory, the Server versions will still support Windows NT 4's NTLM (Windows NT LAN Manager) protocol for authentication of legacy clients, but Active Directory comes with support for Kerberos 5.

Kerberos's biggest benefit is single sign-on, after which a client can access other Windows 2000 servers on the network without reauthentication. Kerberos uses a special server called a Key Distribution Center (KDC), which on Windows 2000 must be a domain controller. The KDC issues "tickets" that a client can offer to other servers for authentication.

In contrast to NTLM, Kerberos can be used to authenticate servers to each other; it also lets clients authenticate servers. Single sign-on extends to non–Windows 2000 servers with other Kerberos 5 implementations or through trusted digital certificate authorities. As with Windows 98, Windows 2000 Professional clients can authenticate with smart cards conforming to the PC/SC 1.0 specification.

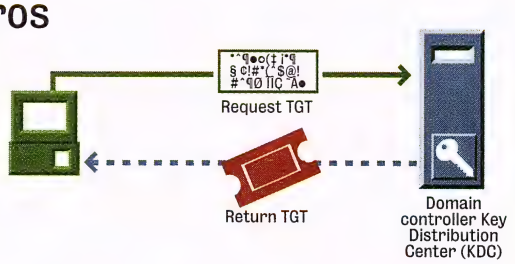
Windows 2000 has an infrastructure for public-key encryption. The Certificate Services can issue, manage, and revoke digital certificates, which are password-protected, encrypted data files that include data used to identify transmitting systems.

Corporate-based certificate servers can be used to authenticate clients and servers to each other or to encrypt data across insecure connections—essential for business-to-business e-commerce.

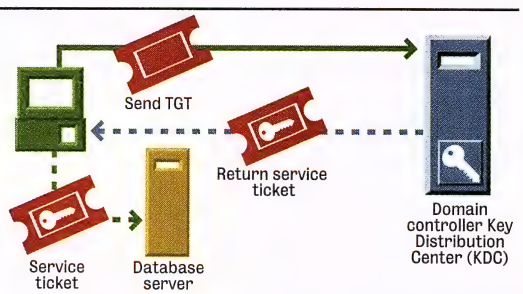
Windows 2000 can use IPSec, an encrypted IP protocol, to encrypt data on the wire. Similarly, it can use SSL and the newer TLS specifications for encrypting data at a higher transport layer. Both of these can be set as mandatory policies in Active Directory for communication between specific clients and servers. And Windows 2000's public-key encryption is the basis for its VPN support.

Windows 2000 Kerberos

CLIENT LOGS ON TO THE NETWORK When the user logs on to the network, the client sends a request for a Ticket Granting Ticket (TGT) to the Key Distribution Center (KDC) located in the domain controller. The request contains a time stamp encrypted with a hash of the user's password, which can be decrypted only by the domain controller.



CLIENT REQUESTS ACCESS TO A DATABASE SERVER
When the user wants to access another service on the network, the client sends a TGT to the KDC. The KDC creates and encrypts the service ticket and sends it to the client. The client then presents the service ticket to the requested server, which has the secret key to decrypt it.



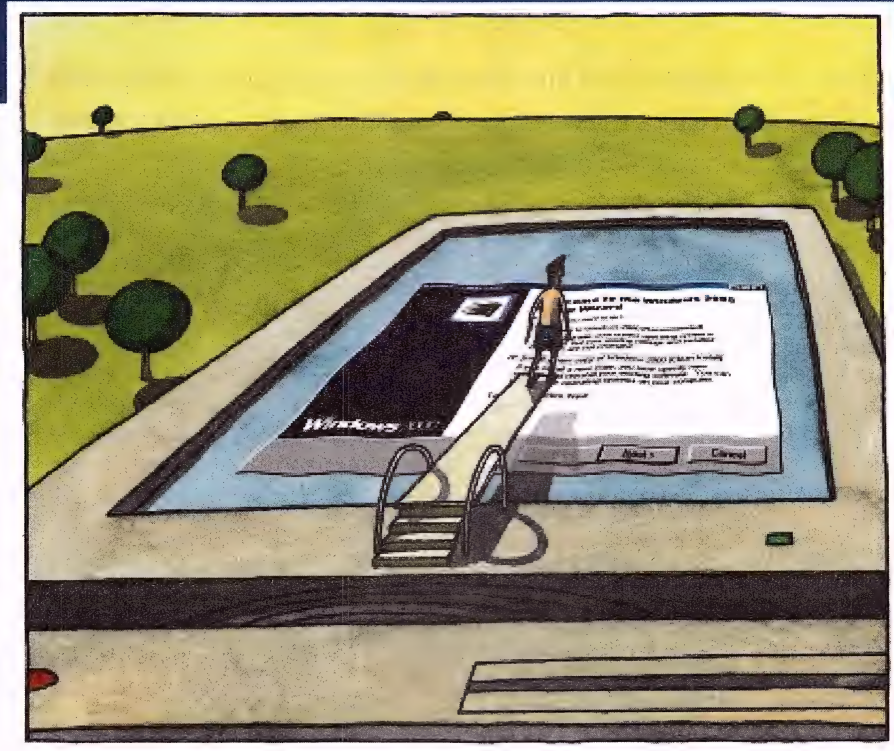
But the coolest use of encryption in the OS is the Encrypting File System (EFS), which lets you encrypt files stored on the disk using keys only individual users and an authorised recovery agent can decrypt. EFS improves the security of systems vulnerable to theft, such as mobile computers. Unless the data thief knows the user's password, he or she can't get at the encrypted data. And EFS is easy to use; encryption is just anther file or folder attribute.

Default rights for users in Windows 2000 are more restrictive than in Windows NT 4. For example, we found that if a user does not have write access to the Program Files\Netscape\Communicator\Users folder, Netscape Communicator will fail, because it needs to write its profile information there.

You can address problems like this by making users members of more powerful groups or by micromanaging rights as necessary.

Using applications that comply with the Windows 2000 Application Specification also solves this problem. Advance planning is mandatory for effective use of the vast security facilities in Windows 2000. If you are to be responsible for the security of a Windows 2000 network, you will do well to investigate training on the topic. —*LS*

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Setup and Migration

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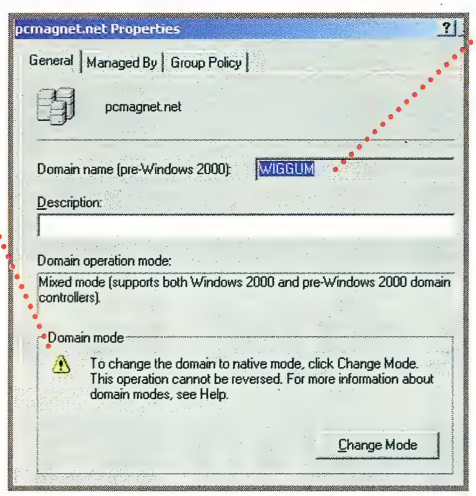
Microsoft has put a lot of effort into making the installation of Windows 2000 as easy as possible. Experienced users will be pleased with Microsoft's online compatibility lists, links to third-party driver updates and patches, hardware update site, and improved installation wizards. Unfortunately, during our extensive testing of desktops and notebooks upgrading from Windows 95,

95, 98, and NT 4 to Windows 2000 Professional, we ran into a host of problems (see the sidebar "The Good, the Bad, and the Upgrade", and look for our detailed summary online). We found particular problems with nonfunctioning multimedia hardware and software, including audio devices, printers, CD-RW drives, USB devices, and graphics cards and software. The average corporate IT department will have the expertise to overcome many of these problems but will have to download multiple patches and driver updates from third-party Web sites. Upgrades from Windows 98 were particularly difficult. You may be better off uninstalling your applications and reinstalling them after upgrading the OS. Less experienced users may find upgrading too much of a challenge.

Full migration to Active Directory is also a formidable task. Directory migration is discussed in more detail in the Active Directory section.

The hardware requirements for Windows Professional are reasonable. You need 64MB of RAM and 1GB of disk space. Windows 2000 Server requires a 133MHz Pentium with 900MB of available disk space and at least 128MB of RAM.

GOING NATIVE Changing to Native Mode may look simple, but it requires careful planning and an upgrade of all your domain controllers to Windows 2000.



DOMAIN TO DNS Active Directory uses DNS domain names. Legacy WINS clients use the Windows NT 4 domain names until they are upgraded.

WINDOWS PROFESSIONAL

To begin a Windows 2000 Professional or Server installation from CD, it is recommended that you first run \i386\winnt32 /checkupgradeonly from the installation CD to check for possible hardware compatibility problems. You can expect many of your Windows 9x applications to run in Windows 2000. There are some problems, however, with system-level software, such as virus protection and third-party systems-maintenance utilities. Check with your software vendors.

After scanning for compatibility, Windows 2000 creates a report found at c:\windows\upgrade.txt that lists all the complications you may find when upgrading your particular system. Our typical upgrade took between 45 and 90 minutes. The network-based installation of Windows 2000 is tricky, but once you get the configuration right you can install thousands of nodes using a common configuration and thus minimising errors. To set this up you must first copy files from the \i386 directory found on the Windows Professional installation CD to a shared directory on the file server. You need to install Setup Manager in order to create an unattended answer file.

INSTALLING SERVER

We upgraded an existing Windows NT 4 Primary Domain Controller (PDC), then two Backup Domain Controllers (BDCs). We then switched from Mixed Mode to Native Mode, which transforms all Windows NT 4 domains into Active Directory domains. The PDC upgrade took two hours; the BDC upgrades took 45 minutes each.

Once we selected the Per Seat Licensing Mode for each server, we needed to enter the computer name, account, and password and select the components to install. Next we provided the IP address for the server and set the workgroup domain name.

Make sure to disconnect the Backup Domain Controller so that if something goes wrong, you can simply promote it. And back up your PDC before upgrading. —*DL*

WINDOWS 2000 PRICING

	PRICE	DESCRIPTION	PROCESSORS SUPPORTED	MEMORY SUPPORTED	NETWORK LOAD BALANCING	SERVER CLUSTERING
Windows 2000 Professional	$539	Standard product	2	4GB	None	None
	$379	Upgrade from Windows 95 or 98				
	$259	Upgrade from Windows NT Workstation				
Windows 2000 Server	$1939	Standard product (with 10 client access licenses)	4	4GB	None	None
	$949	Upgrade from Windows NT Server (with 10 client access licenses)				
Windows 2000 Advanced Server	$6499	Standard product (with 25 client access licenses)	8	8GB	32 nodes	2 nodes
	$5829	Upgrade from Windows NT Server Enterprise Edition (with 25 client access licenses)				

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BENCHMARK TESTS

Windows 2000

Windows 2000 Server performed better than Windows NT 4 Server across the board. In desktop performance Windows 2000 Professional was mostly unremarkable compared with Windows NT 4.

WINDOWS 2000 PROFESSIONAL

PC Magazine Labs ran a variety of standard benchmark tests on Windows 98 SE, Windows NT 4 Workstation, and Windows 2000 Professional using several memory sizes. The ZD Business Winstone 99 test results showed Windows 2000 Professional's performance running typical business applications equivalent to that of Windows NT 4 Workstation. Both operating systems were faster than Windows 98 SE. Where Windows 2000 really excelled—besting Windows NT by as much as 22 percent in some configurations—was on noticeably when we moved from 64MB to 128MB across all platforms. On the desktop systems, Windows NT 4 using FAT16, edged out Windows 2000 using FAT32 at both 64MB and 128MB but was slightly slower at 256MB. Under NTFS at 128MB, Windows NT 4 scored three percent higher than Windows 2000.

Testing Windows 2000 with 3D WinMark was problematic—surprising, considering that this was final code for the OS. We learned from Microsoft that Windows 2000 supports very few 3D graphics boards properly, so most users will have to download upgraded drivers. Although the new OS includes Direct 3D, the driver for our popular Diamond Viper V770 card did not support a Direct 3D Hardware Abstraction Layer (HAL), so our 3D WinMark tests could not take advantage of hardware acceleration.

We contacted nVidia and obtained a newer driver (Version 3.64) that supports Windows 2000 and presents a 3D HAL. Windows 2000 outperformed Windows 98 SE, but this was because we forced the Windows 98 driver to execute our test properly, which slowed it down. We ran i-Bench on the desktop systems only at 128MB because of a lack of differentiation at other tested memory sizes. Windows NT 4 and Windows 2000 each outperformed Windows 98 SE by a wide margin on our Load Complex Pages test. Windows NT 4 edged out Windows 2000 by a slim margin.

Our BatteryMark 3.0 tests use ACPI to manage the screen (keeping it on) but does not use any other lower-level ACPI device management. We found similar battery life results under all operating systems.

We used a Dell Dimension XPS T550 as our desktop testbed and a Compaq Armada M700 corporate system as our notebook test-bed. *—Analysis written by Nick Stam*

DESKTOP SCORES

▲ High scores are best.
▼ Low scores are best.
Bold type denotes first place.

	ZD Business Winstone 99				ZD Content Creation Winstone 2000				ZD 3D WinMark 2000	i-Bench	
	FAT, 64MB ▲	FAT, 128MB ▲	NTFS, 128 MB ▲	FAT, 256MB ▲	FAT, 64MB ▲	FAT, 128MB ▲	NTFS, 128MB ▲	FAT, 256MB ▲	128MB ▲	Load Complex Pages (seconds), 128MB ▼	Java VM 128MB ▲
Windows 2000 Professional	27.9	32.1	30.3	**32.8**	18.4	**25.6**	**24.7**	N/A[1]	**30.8**	18.1	52,254
Windows NT 4	**28.4**	**33.2**	**31.3**	32.3	18.8	21.8	20.2	24.7	N/A[2]	**16.2**	52,166
Windows 98 SE	23.4	26.2	N/A[3]	25.2	**21.5**	22.9	N/A[3]	**25.0**	26.4	30.4	**52,431**

N/A[1]—Not applicable: The software did not complete this test. N/A[2]—Not applicable: 3D WinMark does not run under Windows NT.
N/A[3]—Not applicable: Windo ws 98 does not support NTFS.

On Content Creation Winstone, Windows 2000 outperformed Windows NT by more than 22 percent under NTFS and 17 percent under FAT on the desktop system at 128MB, no doubt a benefit of Windows 2000's better memory management and support for IDE DMA. At the lower, 64MB memory settings, Windows 98 actually scored best.

NOTEBOOK SCORES

High scores are best.
Bold type denotes first place.

	ZD Business Winstone 99				ZD Content Creation Winstone 2000			ZD BatteryMark 3.0 (hours:minutes)
	FAT, 64MB	FAT, 128MB	NTFS, 64MB	NTFS, 128MB	FAT, 64MB	FAT, 128MB	NTFS, 128MB	128MB
Windows 2000 Professional	N/A[4]	N/A[4]	**21.7**	**25.8**	15.0	**19.8**	**19.8**	2:57
Windows NT 4	**21.7**	**27.4**	N/A[4]	25.6	14.5	19.7	18.9	3:01
Windows 98 SE	19.8	22.4	N/A[3]	N/A[3]	**16.5**	19.1	N/A[3]	**3:06**

N/A[3]—Not applicable: Windows 98 does not support NTFS.
N/A[4]—Not applicable: We did not run the test for this configuration.

Windows 2000 Professional's scores on our notebook tests were mostly equivalent to those of Windows NT 4 but better than those of Windows 98. ZD BatteryMark 3.0 scores were also equivalent, as ACPI does not significantly affect battery life.

ZD Content Creation Winstone 2000, which measures the performance of multiple applications used to develop Web content. This was because of Windows 2000's use of Direct Memory Access for IDE transfers versus Windows NT 4's programmed I/O. Windows 2000 also did exceptionally well on ZD 3D WinMark 2000, though a driver upgrade was required, and we found out that the OS does not natively support many of the graphics boards on the market. Running ZD i-Bench, Windows NT 4 displayed Web pages slightly faster than Windows 2000 did. Both operating systems were much faster than Windows 98 SE. We tested a single notebook and found that with ACPI support in Windows 2000, notebook battery life was no better than with Windows NT 4.

As expected, Business Winstone performance improved

WINDOWS 2000 SERVER AND ADVANCED SERVER

Windows 2000 Server's performance surpasses that of Windows NT 4 Server. Our benchmark tests showed across-the-board improvement for several network-server functions including file and print, application service, and serving up Web pages. Architectural enhancements in network communication, multiprocessor scaling, and file-system components account for the overall boost.

Our NetBench 6.0 Enterprise Disk Mix scores represent a typical high-load file-server scenario. It was on this test that we saw the most dramatic performance gains. With only two CPUs Windows 2000 easily matched Windows NT 4's high-water mark with four CPUs. At peak performance, Windows 2000, running with four CPUs scored a nearly 30

Who'd have thought...

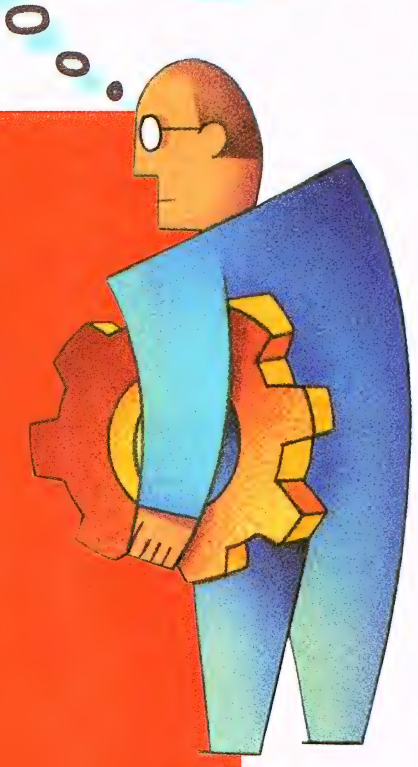


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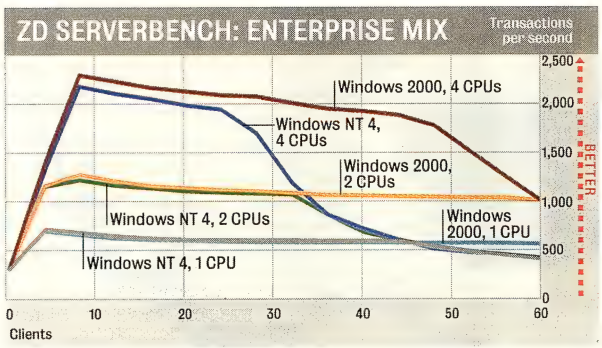
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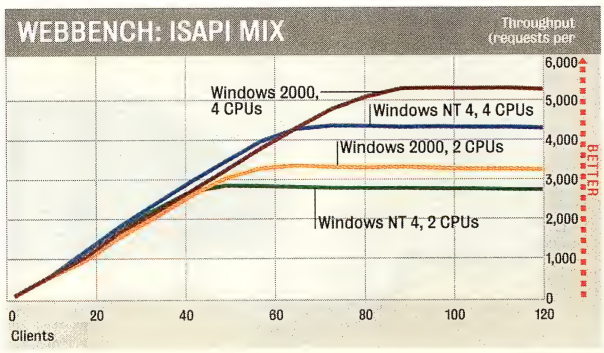
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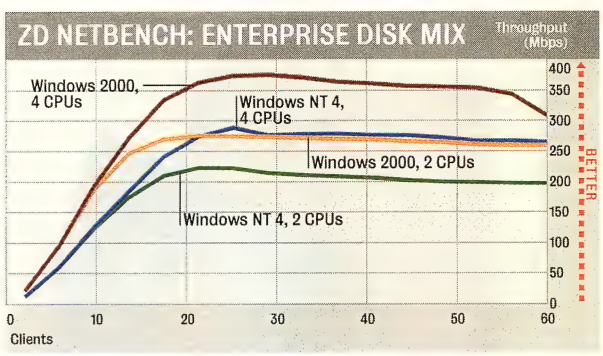
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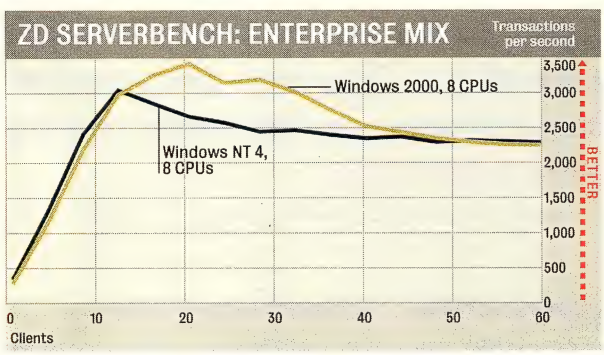
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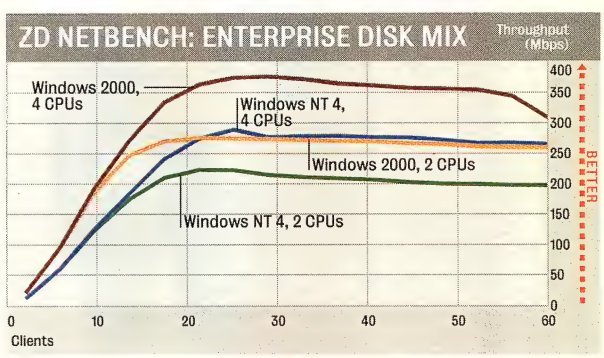
BENCHMARK TESTS











Faster all around. Windows 2000 Server outperformed Windows NT 4 on every test, thanks to improved networking and operating system components. The biggest performance increase was on NetBench, where Windows 2000 running on a two-CPU system performed as well as Windows NT 4 on a four-CPU system, and performance on a four-CPU system was 30 percent faster.

percent improvement over Windows NT 4's highest numbers with four CPUs. These differences are mostly due to a new version of Server Message Block (SMB) and improved TCP/IP networking for routing traffic. Of particular note is the new ability to off-load Checksum to network adapters. (Checksum is the mathematical calculation that verifies the accuracy of network data packets.)

For Web serving the newest version of the Internet Information Server (IIS 5.0) has an improved caching mechanism and the ability to parse data more effectively for handling the static content of our WebBench 3.0 tests. Windows 2000 Server's new TCP/IP driver interface and its optimisation of the driver code improves the way network connections are established. In fact, on our WebBench 3.0 Static Mix tests, we were unable to arrive at a peak score on our four-CPU test, even with 120 clients pounding the server. On the WebBench 3.0 ISAPI Mix testing, which includes 20 percent dynamic content, with four CPUs we measured a 22 percent improvement over Windows NT 4 at peak scores.

The ServerBench 4.1 Enterprise Mix test portrays an application server environment. While here Windows 2000 didn't have huge performance advantages over Windows NT 4, it did sustain higher numbers over the run of the test as well as better peaks with a large number of CPUs.

Our only eight-CPU testing of Windows 2000 Advanced Server showed its superior ability to scale, with a peak of over 12 percent better at 20 clients versus the best score of Windows NT 4 at 12 clients. With four CPUs, there was a difference at the peak of a little over five percent.

Distinct dips in the Windows NT 4 test results with two and four CPUs indicates reliance on the disk subsystem after caching limits were exceeded.

There was no difference when we tested single CPUs. At two and four CPUs, however, we noted extreme performance declines by Windows NT 4 at 32 and 24 clients respectively. Because of its new algorithm for file caching and its ability nearly to double virtual file-system cache space to 960MB, Windows 2000 can keep data in faster system memory and avoid going to disk. *—Analysis written by Andrew Garcia* PC

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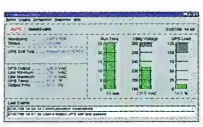




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19INCH-MONITORS

BIG SCREEN

WE TAKE A LOOK AT THE LATEST IN BIG-SCREEN DISPLAYS

BY MARK SNELL & KIRE TERZIEVSKI

As the 17in monitor takes on the role of the entry-level display, the 19in monitor is elbowing its way to the fore as the most sought-after size for new system buyers.

This month brought us an impressive range of the brightest and sharpest 19in monitors available. And what has changed since we looked at this category last? On Screen Displays (OSD) are generally getting better. There are fewer buttons that do more, and their functions are better explained. USB is entering the monitor market, with hubs built into the monitors (or offered as options). There are more "flat screen" (not flat panel) models this time around, and they are certainly distinctive. We found refresh rate adjustment extremely important in many instances (crucial to eradicating moire patters). A few of the "professional" series monitors did not cope well with the 85Hz we selected to test the monitors. A change up or down a few Hz was all we needed to fix the situation. EMF readings were generally down, at least in front of the monitor, though even the higher readings we had from the IT Test Lab Standard monitor were well within recommended limits.

IN THIS REVIEW

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92 LG StudioWorks 995E
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94 Panasonic PanaFlat PF90
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Acer 99sl

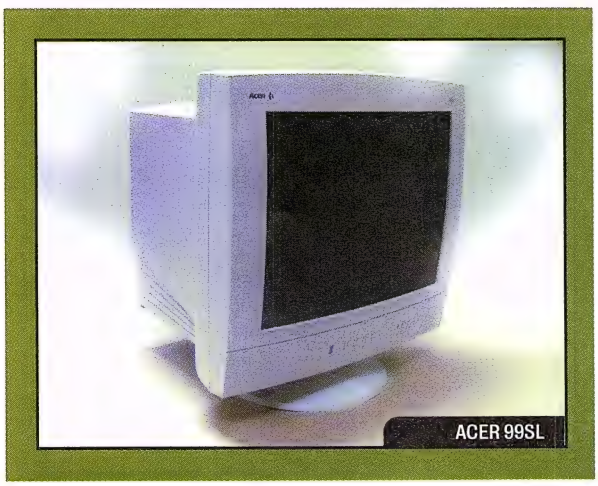
Price: $999. Acer Australia. Tel: 02 8762 3000, Fax: 02 9764 2368. www.servex.com.au. Score: 7.5

The Acer 99sl is a clean looking monitor with cutaways at the bottom breaking up the square look. Trapeziodial OSD & power buttons also lend this monitor a unique look.

The OSD consists of five buttons laid out in a straight line. The buttons are clearly labelled, but the icons used within the display are a little confusing. The leftmost button, which is purple, acts as an auto-configure, which seems to do a nice job setting the monitor up. If you want more control, this monitor provides controls that include horizontal and vertical moire and top and bottom hook.

Input is from a 1.5m fixed cable and the monitor swivels smoothly through 180° of horizontal movement.

On our Master Test Page, the colours were okay, with a good yellow, but there were some moire patterns visible, and the smaller circles showed some fuzziness.


ACER 99SL

In the moire tests, we were unable to totally eliminate moire in the full-res pattern, but it was pretty close. There were also some very slight bands in the 2/3 res pattern.

The greyscale test was excellent, all steps were clearly identifiable, and the yellow was excellent. All steps can be seen in the colour scales test, but the yellow looked a little muddy here, the red looked orangish and orange headed toward brown.

Text quality was quite good at 1280 x 1024—characters were sharp and smooth. At 1600 x 1200 text was blurry but horizontal and vertical lines seemed quite sharp.

The EMF readings from the Acer were amongst the highest of all the monitors tested, although from the back emissions were negligible, which is quite unusual.

ADI G-66

Price: $899. AKA Technology. Tel: 03 9562 0022, Fax: 03 9562 2696. www.akatech.com.au. Score: 6.0

The ADI monitor features curvy lines and a slightly creamy colour, which seems to make what is on the screen look a little off-colour. The monitor also shipped without a manual, which made it a little difficult to find out some of the information for our features table.

There is a three-button OSD and separate rotary dials for brightness and contrast. The OSD sub menus are rather confusing, though there are many features available, including: moire and convergence (horizontal and vertical), linearity and hook adjust.

The monitor we received was a little difficult to swivel through its horizontal range of slightly less than 180°. Input is from a fixed 1.5m cable.

On the Master Test Page, the colours were quite good, with a good black, but some of the smaller circles showed red coming through.

In the moire tests, we could not see any problems—all the lines looked rock solid.

In the greyscale test, the black was quite true, but range was limited to being able to see 4 (black) or 253 (white), but not both at the same time. Colour scales were fairly standard amongst the tested monitors.

Text and border edges were quite poor at both 1280 x 1024 and 1600 x 1200. This was what really let this monitor down.

The EMF for this monitor was even higher than the Test Lab Standard. Though from the back there was almost no radiation.


ADI G-66

very unusually shaped button and a rotary dial for the OSD. Like its flat-screen brother, the OSD is setup as a long list that you have to scroll through. The items are very well labelled, and each provides a numeric indicator. Features include horizontal and vertical moire, purity and S-curve adjustments.

The monitor swivels smoothly through 180° of horizontal movement and input is from a D-sub connector with a 1.5m cable.

On our Master Test Page, the colours were quite good, but some of the smaller circles showed some fuzzy horizontal lines.

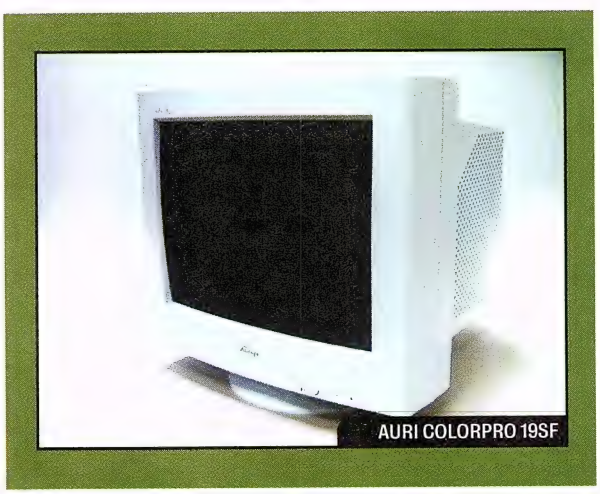
In the moire tests, we could not totally eliminate moire in the full res pattern, but it was pretty close. There was also some red coming through the 1/2 res pattern.

In the greyscale test, the black was very true, but range was not fantastic. The 4 (black) and 251 (white) areas were hard too see. Colour scales were very good. Text quality was quite good at 1280 x 1024—characters were fairly sharp and smooth. At 1600 x 1200 text and lines were still sharp but the monitor seemed to lack contrast. The EMF

Auriga ColorPro 19SF

Price: $899. AKA Technology. Tel: 03 9562 0022, Fax: 03 9562 2696. www.akatech.com.au. Score: 7.0

The Auriga ColorPro 19SF is a nicely styled monitor with a


AURI COLORPRO 19SF

Pro: Panasonic PanaFlat PF90
Budget: Auriga Color Pro D

When testing these monitors, we believe moire patterns and text sharpness to be the most crucial factors. If you can't sit in front of the monitor for half an hour without going cross-eyed, it is not doing its job properly. Colour correctness may be important to some (graphic designers, for example), but moire and unsharp text affect everyone.

Two Editors' Choices were awarded, one for the professional, high-end monitors, and one for the more budget conscious.

The pick of the bunch for the professionals was the Panasonic PanaFlat PF90. It's a beautiful monitor with little noticeable moire, and featured razor-sharp text and lovely rich colours.

For those with a leaner pocket, the Auriga Color Pro D is hard to go past at only $899. A flat screen, great colour range, great greyscales and an informative OSD make for a bargain.

A Merit Award would have to go to the LG StudioWorks 995E. It's a lovely monitor from a good stable. We would have loved to see a Flat Screen 19in version but were unable to get one in the time available.

Auriga ColorPro D

Price: $899. AKA Technology. Tel: 03 9562 0022, Fax: 03 9562 2696. www.akatech.com.au. Score: 7.5

The Auriga ColorPro D is the flat-screen brother to the ColorPro SF. The front bezel has very clean look, in fact there is not even a manufacturer's logo on it. There is the power button, an OSD button and underneath is a rotary dial to control the OSD.

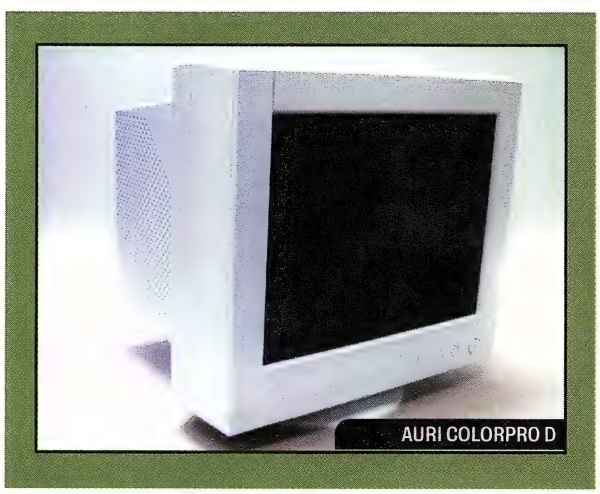
The OSD is set up as a long list that you have to scroll through, though each of the items is well labelled, and provides a numeric indicator. Features include horizontal and vertical moire and convergence, purity and hook adjustments.

The monitor swivels smoothly through 180° of horizontal movement and input is from a D-sub connector with a 1.5m cable.

On the Master Test Page, the colours were very good, but there was some fuzziness in the smaller circles. In the moire tests, we managed to eliminate moire with help of the horizontal and vertical adjusts in the OSD.

In the greyscale test, the black was not quite as good as the ColorPro SF, but it was close. Colour range was very good, though we we had to work a bit to make out 253 (white). Colour scales were very good. Text quality was a little blurry at 1280 x 1024, and at 1600 x 1200 it was not super sharp.

The EMF was about average for this group, but below the Test Lab standard monitor.



Cornerstone C900

Price: $990. Anabelle Bits. Tel: 02 9384 8000, Fax: 02 9666 5655. www.anabelle.com.au . Score: 7.0

The Cornerstone "C" series is aimed at the corporate market, and hits it quite well. It has a very corporate beige square bezel with the OSD set underneath.

The four-button OSD has only small icons to navigate the menus, but it is still fairly obvious what they do. All the controls have numeric indicators for greater level of control.

The monitor swivelled happily through its horizontal range of slightly less than 180°. Input is from either a 1.5m cable that plugs into a D-sub connector, or a set of BNC connectors.

On our Master Test Page, the colours were good, but the yellows appeared a bit washed out and there were some red pixels in the circle patterns and bands of green in the vertical cells. In the moire tests, we could see a few small patterns in the 1/2- and 2/3-res patterns.

In the greyscale test, the black was quite true, and we were just able to make out both the 4 (black) and 253 (white).

In the colour scales test all the increments looked fine, but the yellow patch had a mustard-coloured tinge and there were a few bands of stray colour at the edges of the purple and orange cells.



Text and border edges were okay at 1280 x 1024 but at 1600 x 1200 they were starting to look washed out and blurry.

The EMF was the highest of the monitors tested, above the Test Lab Standard. It was interesting to note that there was almost no radiation from the back.

Cornerstone P1400

Price: $1590. Anabelle Bits. Tel: 02 9384 8000, Fax: 02 9666 5655. www.anabelle.com.au. Score: 7.3

The P1400 is the professional monitor in the Cornerstone series. It is very square and features a bezel at the bottom that holds all the

How We Tested—19in Monitors

We evaluated each monitor at RMIT IT Test Labs with a series of jury tests. For all tests, we used a MBI SmartPartner BX PIII 733 with a GeForce 256 Deluxe graphics card and set resolution to 1280 x 1024 pixels with 32-bit colour at a 85Hz refresh rate. We also tested at 1600 x 1200 resolution, even though we only recommend 1280 x 1024 resolution for 19in monitors to avoid any eyestrain that might be caused by the fine detail. The higher resolution, however, can sometimes magnify flaws that we could not discern at the lower resolution. For the objective and jury tests, we also used the DisplayMate for Windows Professional Multimedia Edition 2.0 from Sonera Technologies (www.displaymate.com). This series of images is designed to reveal the strengths and weaknesses of a range of attributes, including geometric patterns, colour scales, uniformity, resolution, regulation, convergence, and focus.

After warming up each monitor for 30 minutes, we adjusted the screen image to a standard size using each monitor's digital controls, then tweaked the geometry controls to obtain the best possible image quality.

The jury tests consisted primarily of examining screens from Sonera Technologies' DisplayMate for Windows, each of which is designed to highlight specific flaws. Jurors rated the monitors first by whether they showed any of these flaws. If they did, the jurors decided whether the flaws were "barely visible", "easily visible but not an issue for real-world use", or "distracting in at least some circumstances".

Among the many DisplayMate test screens used in the jury test were several devoted to definition that is how sharp is the image. For the horizontal resolution test, the pattern includes a series of adjacent white and dark lines of various thicknesses designed to display whether the monitor's electron guns can quickly rise to pure white and fall to black as they scan across the screen. Unintended greys and off-whites contribute to a lack of sharpness.

The focus test uses a grid pattern to show whether the electron guns are focused precisely on the phosphors; the test for fine focus uses a tighter pattern. Resolution, the ability for a monitor to resolve fine detail, is demonstrated with a grid pattern in which each square contains either vertical or horizontal lines.

The geometric distortion test viewed by our jury uses a black screen overlaid by a white grid pattern. We looked for pincushion distortion along with other types of geometric anomalies, such as trapezoid, parallelogram, and linearity distortion (a relative compression or expansion of the image in different parts of the screen).

To judge colour accuracy and saturation, our jury used the DisplayMate Colour Scales and Extreme Grey-Scale and Colour Bars tests. Using the colour scales test, we tested for colour saturation, in addition to ensuring that the intensity of each colour increased and faded uniformly. The extreme grey-scale was used to check white saturation, black level and reproduction near peak white and black. Colour bars were used to test purity, vividness and saturation of the primary and secondary colours.

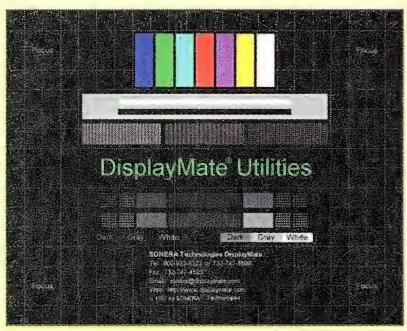
Sometimes a monitor will have a "shadow" to the right of a dark area of the screen. Bright areas can cause the reverse effect in dark areas on the right as the monitor scans across the screen. DisplayMate's streaking and ghosting pattern helped the jurors determine whether monitors exhibited this problem.

Follows examples of the DisplayMate images and what to look out for when viewing the images.

Master Test Pattern

What to look for:

1. Large Circle and Outer Frame: to centre and size the image.
2. Crosshatch Pattern: to check overall linearity and adjust any available user linearity controls, such as pincushion.
3. Corner Circles and Focus Text: to check on corner linearity and focus.



4. Colour Bars: to check the appearance of the standard colours.
5. Black and White Bars on a Grey Background: to check for streaking and ghosting in the image.
6. Resolution Line Pattern: to check on sharpness and resolution.
7. Points, Circles and Dither Patterns: to check for defocusing, blooming, and halos.
8. Grey and White Text: to check on the sharpness, contrast and visibility of text in both normal and reverse video.

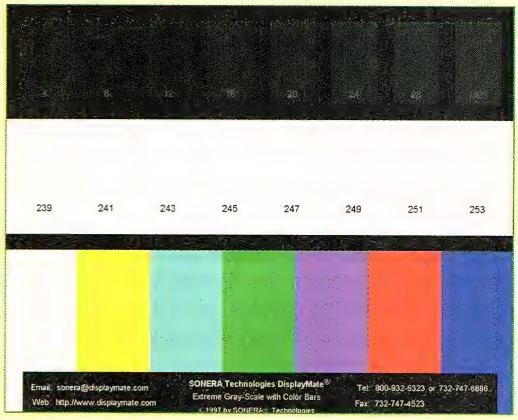
Horizontal Resolution Test

This test pattern checks out the monitor's ability to handle fine vertical line detail. In most cases the monitors will exhibit Moire patterns with the finest of the patterns on the far left, in some cases monitors fail to reproduce the pattern correctly at all.

Colour Scales

What to look for:

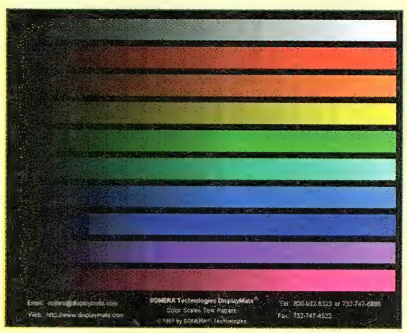
1. The intensity of each of the colours should increase uniformly from black up to a maximum brightness.
2. None of the hues should change with intensity, which is a



colour tracking error.
3. All of the colours should fade uniformly to black together.
4. All of the brightest steps should be distinct, otherwise the image is saturated.

Greyscale Test Pattern and Fine Dot Moire

This test pattern can be one of the most demanding for many low-end monitors, the fine checkerboard background proving too much for some monitors resulting in annoying interference patterns.



What to look for:
1. The Fine Dot Pattern may produce moire patterns and video artefacts on the display. Search for discontinuities, irregularities, ripples, waves, and wisps of intensity fluctuations that appear superimposed on the image.
2. The clustered dark greyscale tests the black-level and accurate intensity reproduction near black. Most of the steps should be visible and distinct.
3. The clustered bright greyscale tests for white saturation and accurate intensity reproduction near peak white. All of the steps should be visible and distinct.
4. There may be streaking and geometric distortion around the greyscales.

Relative EMF

All the monitors' tested at least conform to the MPR II radiation levels. It is also a matter of great debate as to the actual effects on the human body to exposures to various levels of Electro Magnetic Field radiation. Indeed, an information sheet dated April 1995 from the Commonwealth Department of Human Services and Health and their Australian Radiation Laboratory has the following conclusion (the emphasised sections are directly from the paper):

"The overall pattern to date suggests that exposure to magnetic fields may increase slightly the risk of cancer. Exposure to magnetic fields at levels commonly found in the environment is not a proven health risk. Nearly all of these results come from studies involving magnetic fields from sources other than VDTs.

The evidence does not allow health authorities to decide whether there is a specific magnetic field level above which chronic exposure is hazardous or compromises human health. In any event, the exposure of VDT operators has decreased markedly over the years because of modifications in the design of VDTs leading to reduced magnetic field emissions. In general, VDT operators are exposed to magnetic fields that are no higher than those to which half or more of the work-force are exposed."

A letter from the Australian Radiation Laboratory goes on the say the National Health and Medical Research Council recommended the magnetic field exposure limit for members of the public is 1000 milligauss. The letter goes on to quote the NHMRC to wit "although there are limitations in the epidemiological studies that suggest an increased incidence of cancer among children and adults exposed to 50/60Hz fields, the data cannot be dismissed. Additional study will be required before these data can serve as a basis for risk assessment."

The RMIT IT Test Lab's Lutron EMF-822 EMF Field Tester is not calibrated to any recognised standards, but does produce reproducible, relative measurements for the monitors we tested. It should be noted however, that at no time did we measure EMF levels more than 4% of the recommended levels, even hard up against the monitor case.

We measured the test monitors' EMF relative to the new RMIT IT Test Lab's Standard Monitor, which happens to be a Sony Multiscan 200sf 17". There is not necessarily anything particularly special about this monitor, but it does serve as a useful yardstick to the test monitors' relative EMF radiation.

We carried out all measurements in front of the centre of the monitor's picture tube and the results were tabulated.

OSD buttons.

The OSD is made up of no less than 12 buttons, some of which you need to hold down while you press others to bring up certain functions. All the icons are printed on the bezel, but it is much more difficult and confusing to use than some of the four-button arrangements like the Viewsonics.

The swivel base had a horizontal range of only 90°, and input connection was a D-Sub with a 1.5m cable. It seems odd that the corporate model supports BNC while the professional has only a D-sub.

On the Master Test Page, the colours were average. Yellows appeared washed out and there were some red pixels in the circle patterns and some moire patterns.

In the moire tests, we initially could not get rid of some very nasty moire patterns, but we later found that a change of refresh rate made things look much better. We still weren't able

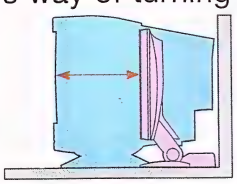
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CORNERSTONE P1400

to remove all moire patterns though.

In the greyscale test, the black was a little muddy, and we were able to make out either the 4 (black) or the 253 (white), but not both.

In the colour scales test all the increments looked fine (except for the orange which looked a little brown).

Text was not very smooth or sharp at 1280 x 1024 and at 1600 x 1200 it was starting to look washed out and blurry.

The EMF readings were amongst the lowest (in contrast to the corporate brother, which was right at the top).

CTX VL950

Price: $930. Ocean Office Automation. Tel: 02 9748 6788, Fax: 02 9748 6513. www.ocean.aust.com. Score: 6.3

The CTX has a strong, clean finish to front bezel, which flows from the bottom of the standard CRT through the six buttons used to manipulate the OSD.

The OSD is slightly overcomplicated with brightness and contrast controls that are also used to manipulate facets of the display when you get to the correct menu. Many of the other OSDs with fewer buttons were simpler to use.

Input is from a 1.5m fixed cable and the monitor swivels smoothly through 180° of horizontal movement.

On our Master Test Page, the colours were quite warm, and the black was rich and deep.

The central moire field also showed some slight ripples. In the specific moire tests, the monitor performed very well, with only a few circular patterns in the top left corner of the full res pattern. The greyscale test was good, we could just make out 253 (white) and all the blacks were rich and distinct.

All steps can be seen in the colour scales test, but the orange was starting to head a little toward brown.

Text quality was a little blurry at 1280 x 1024, and at 1600 x 1200 the overall image was a bit blurred, and there was a green streak down the left-hand side of the screen. EMF readings were quite low for this group.


CTX VL 950

Hitachi CM766ET

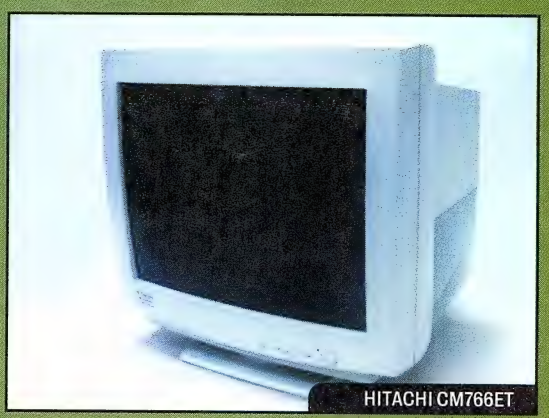
Price: $1195. Hitachi Australia. Tel: 02 9888 4100, Fax: 02 9888 4188. www.hitachi.com.au. Score: 7.3

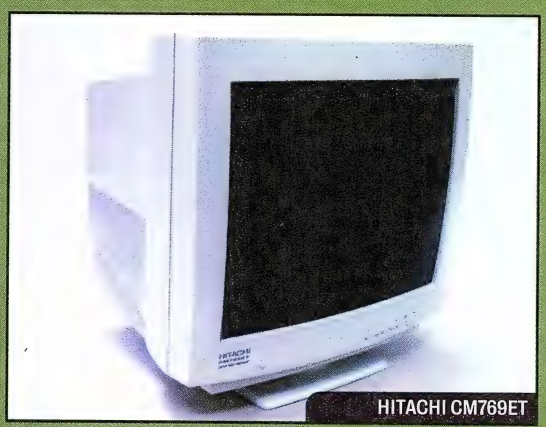
The .21 dot pitch Hitachi monitors are rather rounder looking than most of the other monitors we reviewed. The OSD consists of five buttons laid out in straight line. Navigation of the menus was confusing, and the OSD disappeared too quickly, especially when we were trying to have a quick look at the manuals or attempting to check the effect of a change in different corners of the screen. OSD features included horizontal and vertical moire adjust as well as individual RGB settings and an option for northern or southern hemisphere.

The swivel base is smooth and easy flowing, with standard vertical range, though the horizontal range is slightly less than 180°. There is a single D-Sub socket accompanied by a 2m cable.

On our Master Test Page, the colours were okay, but the yellow seemed dull, and there were red pixels visible in the circle fields.

In the moire tests, we were able to totally eliminate moire but there was a cyan colour showing through in the full res test pattern.


HITACHI CM766ET


HITACHI CM769ET

The results of the greyscale test were below average—we had trouble distinguishing the 4 and 8s (black) and 253 (white). Text quality, however, was excellent at 1280 x 1024—sharp and smooth. Even at 1600 x 1200 text was still very readable. The EMF was amongst the lowest of all the monitors tested.

Hitachi CM769ET

Price: $1595. Hitachi Australia. Tel: 02 9888 4100, Fax: 02 9888 4188. www.hitachi.com.au. Score: 7.3

The Hitachi CM769ET is the big brother of the Hitachi monitors, in features as well

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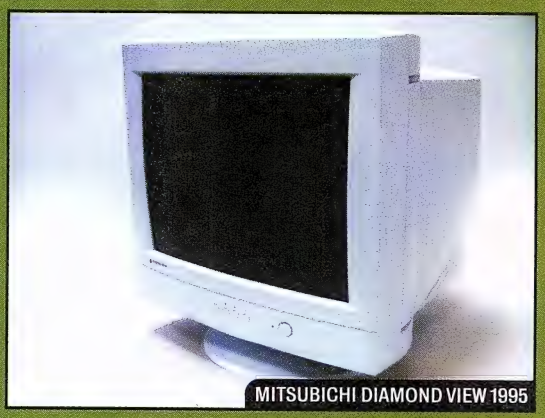

LG STUDIO WORKS 996E

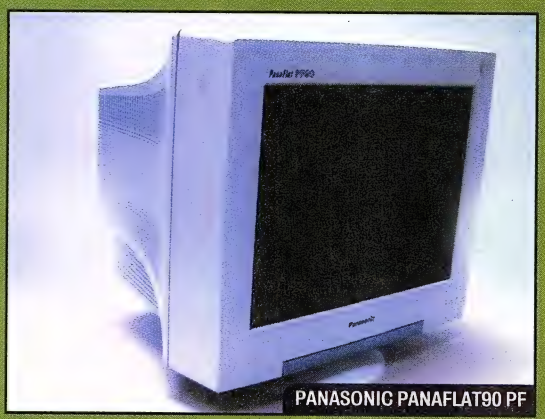
as price. The OSD is the same confusing five buttons laid out in a straight line. OSD features included horizontal and vertical moire adjust as well as individual RGB settings and an option for northern or southern hemisphere. The swivel base is again smooth and easy flowing, with standard vertical range, though the horizontal range is slightly less than 180°.

There are two inputs, a fixed 2m cable and an extra D-Sub socket. You might want to use this to plug two computers in and then you could switch between them via the OSD or a button on the front panel.

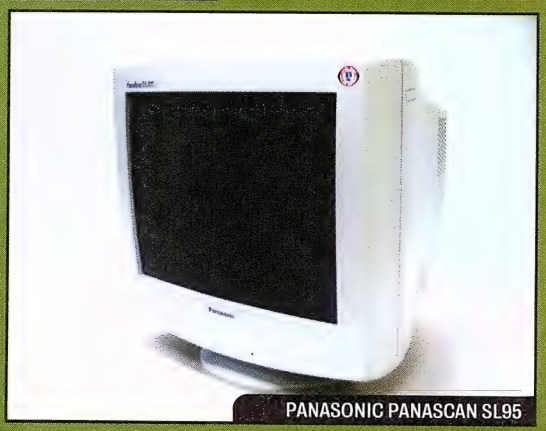
There is a small panel on the back with the USB symbol on it, but it opens to show only empty space and a small connector at the back, so there is obviously an optional USB card available.

On our Master Test Page, the colours were very good, though there were red pixels visible in the circle fields. This monitor looked great in the moire tests, we were able to totally eliminate moire from all our test patterns. The greyscale test was in the average range, better than its brother, the 766ET.


MITSUBICHI DIAMOND VIEW 1995


PANASONIC PANAFLAT90 PF

Text quality was excellent at 1280 x 1024, characters were very sharp. At 1600 x 1200 it was still very good, and the monitor will go up to 1800 x 1350 at 75Hz, though we did not test this resolution. Again, the EMF readings were amongst the lowest of all the monitors tested.


PANASONIC PANASCAN SL95

LG StudioWorks 995E

Price: $1199. LG Electronics. Tel: 03 9374 1611, Fax: 03 9374 1610. www.lge.com.au. Score: 7.3

The LG StudioWorks is a very curvaceous looking monitor. The OSD has an activation button and four buttons arranged in a torus (doughnut) around the sixth button in the centre (set). This is a very friendly OSD, manoeuvring around is easy through the submenus and each option has a numeric display, rather than just a slider, so you can tell exactly what setting you are at. There are many features including horizontal and vertical moire and convergence.

The swivel base on the monitor we tested was a little rough, and horizontal range was only 90°. Input connection was a D-Sub with a 1.5m cable.

On our Master Test Page, there were some moire bands visible, and some of the circular areas appeared fuzzy.

The moire tests showed noticeable red/green diamonds in the full resolution patterns, and small amounts of interference in the 1/2- and 2/3-res patterns that we could not fix.

The greyscale test was in the quite good, and the yellows were quite nice. The purple cell had a bit of a blue streak at the bottom, and the red has a purple streak.

In Colour Scales the increments were all visible, but yellows and orange were both a little cool.

Text quality was quite sharp at 1280 x 1024, though at 1600 x 1200 it was a little fuzzy, and we had an issue with the red/blue alignment (especially noticeable in white text). The EMF from this monitor was quite low.

Mitsubishi DiamondView 1995

Price: $1349. Supplied by Pioneer Computers. www.pioneercomputers.com.au. Score: 6.5

The Mitsubishi Diamond View has a very clean and simple design, and features a four-button OSD.

The OSD does not contain a huge range of features, though it does have both horizontal and vertical moire adjustments. The swivel base was smooth but with only 90° of horizontal movement. Input connectors were D-Sub and BNC Connectors, selected automatically or via the OSD.

On our Master Test Page, there were bands in the moire area and red pixels showed through in the circular cells. On the up side, the colour was excellent, and yellow in particular was amongst the best. The

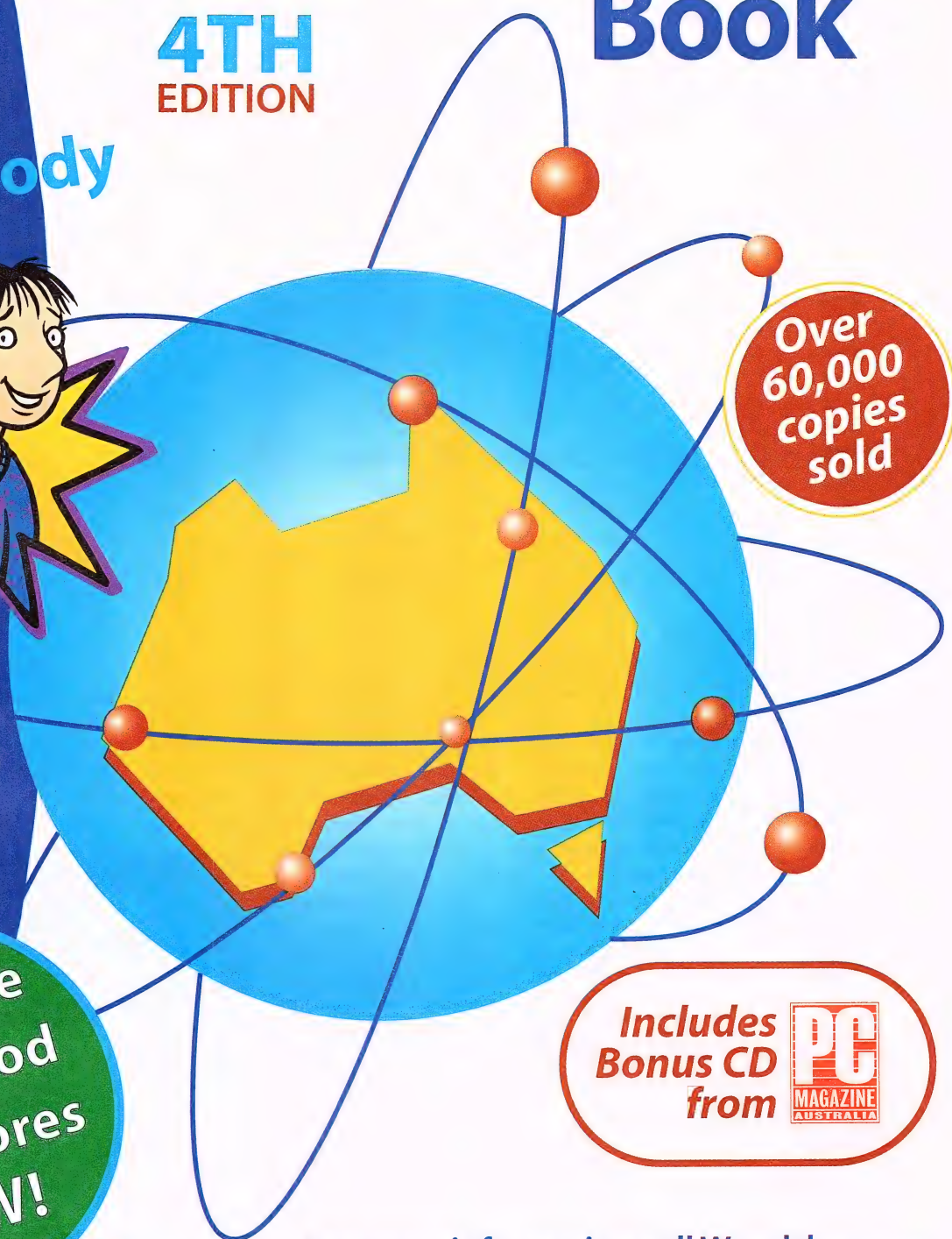
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SUMMARY OF FEATURES

19in Monitors

PC MAGAZINE AUSTRALIA EDITOR'S CHOICE

Name	Acer 99sl	ADI G-66	Auriga ColorProD	Auriga ColorPro 19SF
Distributor	Servex	AKA Technology	AKA Technology	AKA Technology
List Price (inc. tax)	$999	$899	$899	$899
Address	5 Figtree Drive	Unit 9, 214-224 Wellington Road	Unit 9, 214-224 Wellington Road	Unit 9, 214-224 Wellington Road
	Homebush NSW 2140	Mulgrave VIC 3170	Mulgrave VIC 3170	Mulgrave VIC 3170
Phone number	02 8762 3500	03 9562 0022	03 9562 0022	03 9562 0022
Fax number	02 9764 3290	03 9562 2696	03 9562 2696	03 9562 2696
Internet	www.servex.com.au	www.akatech.com.au	www.akatech.com.au	www.akatech.com.au
Warranty	3 years	3 years onsite	3 years onsite	3 years onsite
MONITOR FEATURES				
Screen size (inches)	19	19	19	19
Screen size viewable (inches)	18	18	18	18
Dot pitch (mm)	0.26	0.26	0.26	0.26
Horizontal frequency range (KHz)	30-98	30-95	30-96	30-110
Vertical frequency range (Hz)	50-160	50-160	50-180	50-150
Maximum resolution @ refresh	1600x1200 @ 78 Hz	1600x1200 @ 75Hz	1600x1200 @ 75 Hz	1600x1200 @ 85 Hz
Rear connectors	15-pin mini D-sub	15-pin mini D-sub	15-pin mini D-sub	15-pin mini D-sub
Number of factory presets	9	N/A	12	15
Number of user settings	15	N/A	N/A	16
Maximum factory preset refresh rates (vertical)				
Hz @ 1024x768	85	85	85	85
Hz @ 1280x1024	85	85	85	85
Hz @1600x1200	65	75	75	85
Miscellaneous				
Integrated microphone/speakers	No/No	Yes/optional	No/No	No/No
Headphone socket	No	No	No	No
Power req. Full/Standby/Suspend in Watts	135/ <15/ <5	160/ N/A/ N/A	150/ 15/ 15	130/ 15/ 15
Weight (kg)	21	22.5	29	23
Size HxWxD (mm)	484x466x428	483x470x420	460x465x475.5	460x465x475

moire tests showed diagonal band interference in the 1/2- and full-res areas that we could not fix with the OSD.

The greyscale test was in the average range, with both 8 (black) and 251(white) only just visible. In the colour scales the DiamondView showed excellent colour increments, all the colours were rich and warm, (though not as good as the Panaflat).

Text quality was a little jagged at 1280 x 1024, and there was a general lack of sharpness. At 1600 x 1200 it was difficult to read.

The EMF was below average, and well below the Test Lab Standard Monitor.

PC MAGAZINE AUSTRALIA EDITORS' CHOICE

Panasonic PanaFlat PF90

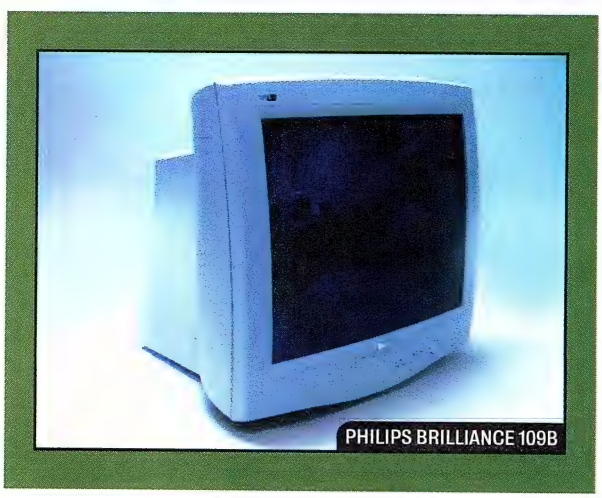
Price: $1500. Panasonic Australia. Tel: 13 26 00, Fax: 02 9986 7340. www.panasonic.com.au. Score: 8.5

The Panasonic PanaFlat loses the curved bezel of its curved CRT brother to focus on the flatness of the screen. Another interesting feature is that the OSD buttons are hidden behind a small drop-down door at the bottom of the screen. These can be handy to stop prying little fingers playing with the settings. The OSD features four buttons, and most of the features of its curved brother, including colour purity, vertical moire, horizontal and vertical convergence, S Curve and two linearity adjustments.

Again, the swivel base had a smooth 180° of movement horizontally. Input connectors were D-Sub and BNC connectors, selected automatically or via the OSD.

On our Master Test Page, display overall was excellent. The black was very rich and the yellow was outstanding. There was a small amount of interference in the first vertical line field. The moire tests looked okay, there were some ripples in the full-res; 1/2-res was excellent and 2/3-res showed tinges of green and some fuzziness. The greyscale test was good, with 253 (white) only just visible. In the colour scales test, the PanaFlat beat the rest hands down; the yellows were especially vivid.

Text quality was fantastic at 1280 x 1024


PHILIPS BRILLIANCE 109B

Cornerstone C900	Cornerstone P1400	CTX VL950	Hitachi CM766	Hitachi CM769
Anabelle Bits	Anabelle Bits	Ocean Office Automation	Hitachi Australia	Hitachi Australia
$990	$1590	$930	$1,195	$1,595
8 Lord Street	8 Lord Street	38-42 Stubbs Street	13-15 Lyonpark Road	13-15 Lyonpark Road
Botany NSW 2019	Botany NSW 2019	Auburn NSW 2144	North Ryde NSW 2113	North Ryde NSW 2113
02 9384 8000	02 9384 8000	02 9748 6788	02 9888 4100	02 9888 4100
02 9666 5655	02 9666 5655	02 9748 6513	02 9888 4188	02 9888 4188
www.anabelle.com.au	www.anabelle.com.au	www.ocean.aust.com	www.hitachi.com.au	www.hitachi.com.au
5 years; 1st year onsite	5 years; 1st year onsite	3 years	3 years	3 years
19	19	19	19	19
18	18	18	18	18
0.22	0.22	0.26	0.21	0.21
30~95	31~107	30~85	31~96	31~115
50~180	50~160	50~160	50~180	50~180
1600x1200 @ 76 Hz	1600x1280 @ 80 Hz	1600x1200 @ 75Hz	1600x1280 @ 75 Hz	1800x1350 @ 75 Hz
15-pin mini D-sub, BNCx5	15-pin mini D-sub	15-pin mini D-sub	15-pin mini D-sub	15-pin mini D-sub
6	9	12	5	5
13	26	10	21	21
85	85	85	85	85
85	85	85	85	85
75	85	75	85	85
No/No	No/No	No/No	No/No	No/No
No	No	No	No	No
140/ <15/ 4	125/ 15/ 5	120/ <8/ <8	125/ 7/ 2.5	125/ 7/ 2.5
21.5	25	19.5	22	22.5
454x448x415	454x448x460	460x453.5x456	442x448x447	442x448x447

and 1600 x 1200 was excellent as well. The EMF from the front was in the high range, just below the Test Lab Standard Monitor.

Panasonic PanaScan SL95

Price: $1350. Panasonic Australia. Tel: 13 26 00, Fax: 02 9986 7340. www.panasonic.com.au. Score: 8.3

The Panasonic PanaScan adds a nice curve to break the monotony of the external front panel. The OSD is controlled by four buttons, and is very well laid out over four to five pages. Probably the most feature-rich of the OSDs, the PanaScan has functions including horizontal and vertical moire and horizontal and vertical convergence, S curve and two linearity adjustments. A single 3.5in floppy accompanied the monitor, containing an .INF file. The swivel base was fairly smooth with 180° of movement horizontally. Input Connectors were D-Sub and BNC Connectors, selected automatically or via the OSD.

On the Master Test Page, the display overall was very good. The moire tests looked good, though removing the slight moire in the 1/2-res pattern cost a little sharpness in the text. The greyscale test was in the average range, with both 4 (black) and 253 (white) only just visible. In the colour scales the SL95 showed excellent colour range, especially in the yellows, where many of the other monitors had trouble.

Text quality was very good at 1280 x 1024, but not quite as good as the flat screen version. At 1600 x 1200 it was not so sharp, though still better than most.

The EMF was in the higher range, though still well below the Test Lab Standard Monitor.

Philips Brilliance 109B

Price: TBA. Philips Australia. Tel: 02 9742 8311, Fax: 02 9704 8483. www.philips.com.au. Score: 8.3

The Philips Brilliance "B" model is a new model aimed at the business market, and it seems well placed.

Five buttons control the OSD: two up arrows, two down arrows and a select button. The OSD is very large, clear and easy to understand, it contains both horizontal and vertical moire adjustments as well as individual


PHILLIPS BRILLIANCE 109P

SUMMARY OF FEATURES

19in Monitors

Name	LG StudoWorks 995E	Mitsubishi Diamond View 1995	Panasonic PanaFlat PF90 (PC MAGAZINE AUSTRALIA EDITOR'S CHOICE)	Panasonic PanaScan SL95	Philips Brilliance 109B
Distributor	LG Electronics	Mitsubishi Electric Australia	Panasonic Australia	Panasonic Australia	Philips Australia
List Price (inc. tax)	$1199	$1349	$1500	$1350	TBA (expected availability June)
Address	979 Mt Alexander Road	348 Victoria Road	1 Garigal Road	1 Garigal Road	3 Figtree Drive
	Essendon VIC 3040	Rydalmere NSW 2116	Belrose NSW 2085	Belrose NSW 2085	Homebush NSW 2140
Phone number	03 9374 1611	02 9684 7777	132 600	132 600	02 9742 8311
Fax number	03 9374 1610	02 9684 7208	02 9986 7340	02 9986 7340	02 9704 8483
Internet	www.lge.com.au	www.mitsubishi-electric.com.au	www.panasonic.com.au	www.panasonic.com.au	www.philips.com.au
Warranty	3 years onsite	3 years onsite	3 years onsite	3 years onsite	3 years onsite
MONITOR FEATURES					
Screen size (inches)	19	19	19	19	19
Screen size viewable (inches)	18	18	18	18	18
Dot pitch (mm)	0.26	0.26	0.25	0.25	0.25
Horizontal frequency range (KHz)	30~100	30~95	30~110	30~97	30~96
Vertical frequency range (Hz)	50~200	50~160	50~180	50~180	50~160
Maximum resolution @ refresh	1600x1200 @ 80 Hz	1600x1200 @ 75 Hz	1600x1200 @ 85 Hz	1600x1200 @ 75 Hz	1920x1440 @ 60 Hz
Rear Connectors	15-pin mini D-sub	15-pin mini D-sub, BNCx5	15-pin mini D-sub, BNCx5	15-pin mini D-sub, BNCx5	15-pin mini D-sub, 5xBNC, USB
Number of factory presets	12	14	9	8	34
Number of user settings	13	16	20	20	16
Maximum factory preset refresh rates (vertical)					
Hz @ 1024x768	85	85	90	85	85
Hz @ 1280x1024	85	85	85	85	85
Hz @1600x1200	80	75	85	75	70
Miscellaneous					
Integrated microphone	No	No	No	No	No
Integrated speakers	No	No	No	No	Opt
Headphone socket	No	No	No	No	Opt
Power req. Full/Standby/Suspend in Watts	140/ <8/ <8	140/ <15/ <15	120/ <10/ <3	115/ <10/ <10	95/ <7/ <3
Weight (kg)	23	23	26	20.5	19.7
Size HxWxD (mm)	465x448x476	472x466x493	459x469x438	454x448x415	447x440x440

red, green and blue adjustments.

There is a single incoming USB port on the back (and cable included) that allows manipulation of the screen functions via software, though this was not supplied because this was a pre-production model.


PHILLIPS BRILLIANCE 109S

The monitor swivelled horizontally through 180° and input connection was via a fixed 1.5m cable.

On the Master Test Page, display overall was excellent—colours were bright and vivid, The moire tests looked excellent, all rock solid vertical lines.

In the greyscale test, the greyscales were all clearly visible, and the black was dark and rich while the white was very pure.

In the colour scales test, all levels were visible (though the red was leaning toward orange).

Text quality was excellent at 1280 x 1024, but at 1600 x1200 it had fuzziness and red pixels showing through the white text.

The EMF was average for this group, and well below the Test Lab Standard Monitor.

Philips Brilliance 109P

Price: $1169. Philips Australia. Tel: 02 9742 8311, Fax: 02 9704 8483. www.philips.com.au. Score: 7.0

The Philips Brilliance P model is aimed at the "Professional" market, though this example would not measure up in most professional applications.

The OSD on the professional model utilises the same layout as its partners. Extra controls included in the professional are convergence and purity adjustments.

A USB port is provided on the back, together with the cable. Screen manipulation is performed using the included CustoMax software, an easy-to-use interface that gives the user access to dozens of screen features.

This monitor shipped with swivel base, which moved a little stiffly through 180° of

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Terms and conditions apply.

SUMMARY OF FEATURES

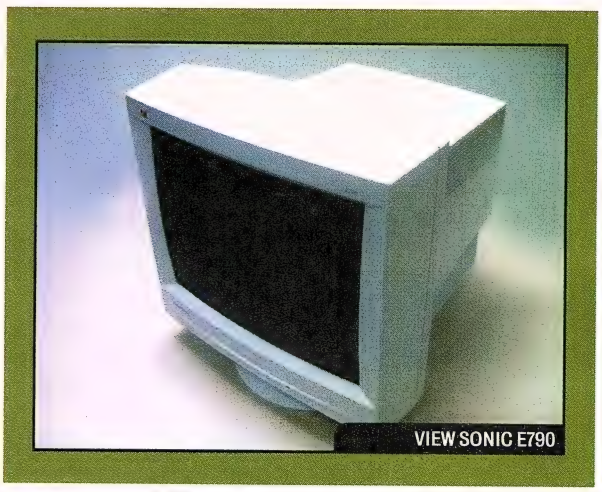
19in Monitors

Name	Philips Brilliance 109P	Philips Brilliance 109S	Sony Multiscan G400	ViewSonic E790	ViewSonic PT795
Distributor	Philips Australia	Philips Australia	Sony Australia	Chips & Bits	Chips & Bits
List Price (inc. tax)	$1,169	$934	$1,699	$1,059	$2,117
Address	3 Figtree Drive	3 Figtree Drive	33-39 Talavera Road	14-16 Boundary Street	14-16 Boundary Street
	Homebush NSW 2140	Homebush NSW 2140	North Ryde NSW 2113	South Melbourne VIC 3205	South Melbourne VIC 3205
Phone number	02 9742 8311	02 9742 8311	1800 226 429	1300 134 833	1300 134 833
Fax number	02 9704 8483	02 9704 8483	02 9805 1241	1300 134 855	1300 134 855
Internet	www.philips.com.au	www.philips.com.au	www.sony.com.au	www.chips.com.au	www.chips.com.au
Warranty	3 Years On-site	3 Years On-site	3 Years On-site	3 Years On-site	3 Years On-site
MONITOR FEATURES					
Screen size (inches)	19	19	19	19	19
Screen size viewable (inches)	18	18	18	18	18
Dot pitch (mm)	0.25	0.27	0.24~0.25	0.26	0.25
Horizontal Frequency range (KHz)	30~110	30~92	30~107	30~95	30~110
Vertical Frequency range (Hz)	50~160	50~160	48~120	50~200	50~180
Maximum resolution @ refresh	1920x1440 @ 60 Hz	1920x1440 @ 60 Hz	1880x1440 @ 70 Hz	1600x1200 @ 76 Hz	1920x1440 @ 73 Hz
Rear Connectors	15-pin mini D-sub, 5xBNC, USB	15-pin mini D-sub	15-pin mini D-sub	15-pin mini D-sub	"15-pin mini D-sub, 5xBNC, USB
Number of factory presets	36	35	25	9	12
Number of user settings	16	16	15	13~15	13~15
Maximum factory preset refresh rates (vertical)					Hz @ 1024x768
Hz @ 1024x768	85	85	85	85	85
Hz @ 1280x1024	85	85	85	85	85
Hz @1600x1200	85	75	85	75	85
Miscellaneous					
Integrated microphone	No	No	No	No	No
Integrated speakers	No	Opt	No	No	No
Headphone socket	No	Opt	No	No	No
Power req. Full/Standby/Suspend in Watts	120/ <6/ <3	95/ <10/ <3	140/ 15/ 15	140/ <15/ <15	150/ <15/ <15
Weight (kg)	23.5	20	26	24	27
Size HxWxD (mm)	469x456x438	447x440x396	464x446x461	465x452x468	458x458x459

horizontal movement.

Input connector were a set of BNCs and a D-sub connector with 1.5m cable. There is an option of a 4-port USB hub.

On our Master Test Page, the display showed interference patterns and red dots through the circle patterns. And though it was impossible to totally remove the moire from all of the test patterns, we did manage to improve performance somewhat by trying different refresh rates.


VIEW SONIC E790

In the greyscale test, the greyscales were visible down to the 253 (white which was hard to make out. In the Colour Scales test, all levels were visible, though white and yellow looked muddy.

Text quality was quite good at 1280 x 1024, but at 1600 x 1200 the characters started to pixelate and looked very fuzzy.

The EMF was higher than its Philips brethren, and a little higher than the average for this group.

Philips Brilliance 109S

Price: $934. Philips Australia. Tel: 02 9742 8311, Fax: 02 9704 8483. www.philips.com.au. Score: 6.5

The Philips Brilliance S model is the "Standard" model in Philips' latest line of monitors, and it provides quite good value for money.

The OSD is the same five-button layout and excellent clarity as the other Philips monitors. This monitor had the shortest yoke (depth) of all the monitors tested, saving valuable desk space. The monitor swivelled smoothly through 180° horizontally and input connection was via a fixed 1.5m cable.

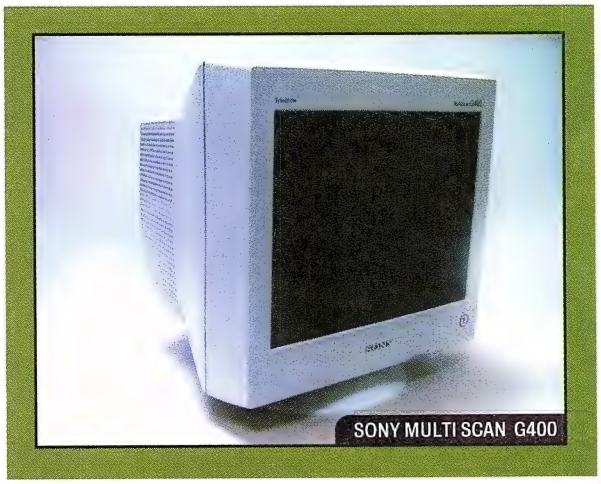
On the Master Test Page, the display was good, similar to the "B" model. The moire tests looked good too, with only the 1/2-res showing small traces of moire that we couldn't get rid of with out losing text quality.

In the greyscale test, the greyscales were excellent. The black was very rich while and

the red was one of the best we have seen.

In the Colour Scales test, all levels were visible, and the yellow was very clear.

Text quality at 1280 x 1024, was as good as the "B" and colours were rich and warm. At 1600 x 1200 it would only sync at 70Hz, but nonetheless was just as sharp as the 109B.


SONY MULTI SCAN G400

The EMF was below average for this group, though it was quite high from the rear of the monitor.

Sony Multiscan G400

Price: $1699. Supplied by Beyond Computers. www.beyondcomputers.com.au. Score: 8.0

The Sony Multiscan is a very clean looking Trinitron flat screen monitor. The lovely picture quality of this monitor, however, is largely let down by the difficulty manipulating the OSD.

The control for the OSD is best likened to an upside-down joystick—you push your finger up into a four-direction motion crater. It's easy to get used to this arrangement fairly quickly if you are from the joystick-driven Generation X, but some of our older baby boomers found it difficult to use. It requires considerably more dexterity than most of the other OSDs. The OSD gives access to some useful features including horizontal and vertical convergence and a lock to keep prying fingers out.

The swivel base gives a very smooth movement over more than 180°. Connection is provided by a 2m cable and an extra D-Sub socket. The OSD will allow you to switch between the two inputs.

The included package contains a Macintosh adaptor and a 3.5in floppy, with an .INF file and Macintosh Colorsync files.

On the Master Test Page, colours were very good, though there were red bands through the background. In the moire tests we weren't able to remove the red bands without losing text quality.

Results of the greyscale test were good, though the 253 (white) was barely visible. Text quality was very good at 1280 x 1024, at 1600 x 1200 it was still quite good, tough not quite as good as the flat screen Panasonic.

The EMF was about the average, but below the TestLab Standard.

Viewsonic E790

Price: $1059. Chips & Bits. Tel: 1300 134 833, Fax: 1300 134 855. www.chips.com.au. Score: 7.8

The Viewsonic is a very square looking Trinitron Flat Screen monitor with a nicely bevelled edge.

The controls for the OSD consist of four buttons layed out in a straight line. The OSD is very easy to use and one of the most feature rich OSDs we saw. All menu options are arranged in a long scrolling list (four pages) and some of the features include: horizontal and vertical convergence and moire.

The swivel base gives an extremely smooth 180°+ of movement. Input connection was a single D-sub with a 1.5m cable.

On the Master Test Page, the displayed colours were very good, though there was a hint of moire bands in some areas.

In the moire tests there were slight red and green diamonds in the full-res pattern and a slight interference curve in the 1/2-res pattern.

Colour scales showed quite good colours and the greyscale test was in the quite good range, we could clearly see 4 (black) and 253 (white).

Text quality was good at 1280 x 1024, though a little fuzzy near the top of the screen. At 1600 x 1200 things were not really any worse.

The EMF was below average, and below the TestLab Standard.

Viewsonic PT795

Price: $2117. Chips & Bits. Tel: 1300 134 833, Fax: 1300 134 855. www.chips.com.au. Score: 7.5

The Viewsonic professional model looks like its baby brother with a squarer Trinitron Flat Screen Monitor and a nicely bevelled edge.

The controls for the OSD are four buttons laid out in a straight line. The OSD is very easy to use and one of the most feature rich OSDs we encountered. All the menu options are arranged in a long scrolling list (four pages)—some of the features include: Hook and Purity (Top and Bottom) and horizontal and vertical convergence. This monitor is held down by only having horizontal moire adjust, especially as its little brother has both horizontal and vertical.

The swivel base gives an extremely smooth 180°+ of movement. Input Connectors were D-Sub and BNC Connectors, selected automatically or via the OSD. USB Connectivity is provided via a four-port hub. The uplink is at the back and two ports are available on each side of the monitor.

On the Master Test Page, the colours were quite good. In the moire tests there were flickering bands in full-res pattern, and traces of interference in the 1/2- and 2/3-res patterns. This was largely removed by a change of refresh rate, but some did remain.


VIEWSONIC PT795

Colour scales showed good colours and the greyscale test was excellent—we could just see 4 (black) and 253 (white).

Text quality was just average at 1280 x 1024, but at 1600 x 1200 it was starting to get fairly fuzzy.

The EMF was above average, but below the TestLab Standard. PC

ONLINE JOB SITES

FINDING THAT JOB ONLINE

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BY ANNA RACITI AND PC MAGAZINE AUSTRALIA STAFF

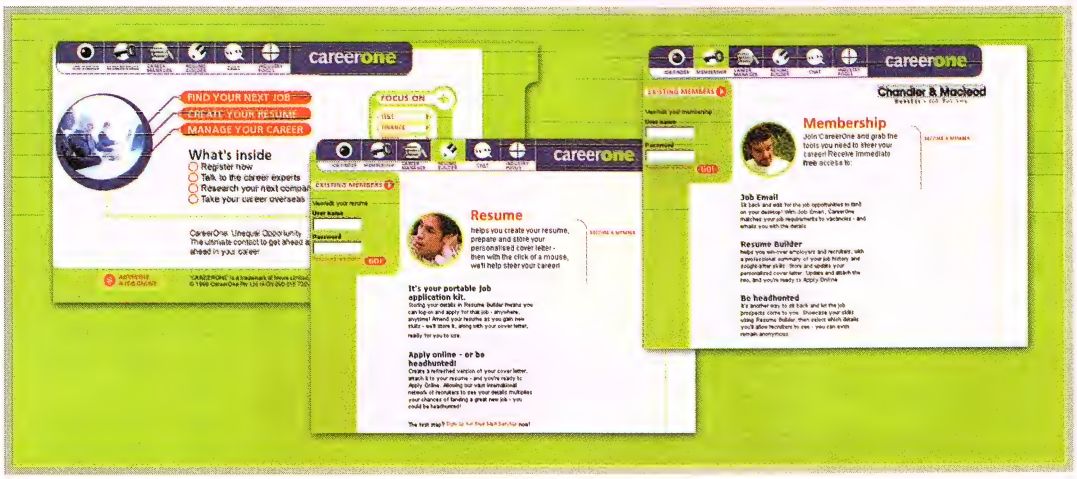
We combed the Internet for the best Aussie online job sites. Here's what we found.

Looking for a new job is one of those stressful tasks that no-one enjoys. It's not just the thought of being grilled by a panel of prospective employers that makes the task unsavoury—finding suitable jobs and applying for them can be time consuming and often frustrating.

When looking for a new job, most people turn to the Employment section of their weekend newspaper. But now there's a new way to look for a job—online. Most online job sites offer you as many or more jobs than any weekly newspaper. Also remember that you can't interact with a newspaper. Online, you can search for a specific job, type in a keyword, specify in which location you want to find work, and in most cases, you can even apply online.

Most of the sites we reviewed this month also offer more than just a job listing. You can find helpful tools such as e-mail job alerts and interview simulators. Some sites also feature chat forums where job seekers can speak to prospective employers in real time.

If you're in the market for a position in Information Technology, you have even more reasons to go looking for positions online. Not only are jobs in IT booming right now, more IT companies are snubbing traditional avenues when advertising their vacant positions, choosing to advertise their jobs online instead.



CareerOne

www.careerone.com.au ●●●

Number of Australian jobs currently listed? 26,000 +
Number of international jobs currently listed? Around five percent of the number of Australian jobs offered.
Can you apply online? Yes.
Can you create and store your resume? Yes, you can build a resume on the site.
Search facilities: You'll find the search facilites in the section called "Find Your Next Job". (Other sections include "Create Your Resume", and "Manage Your Career".) The search options let you choose from one of 21 broad-ranging categories.
Member benefits: Members of CareerOne get access to Job E-mails, the Resume Builder, and they can specify that their details be made available to recruiters.
Extra tools: There are chat facilities as well as a "Candidate Services" section featuring helpful articles such as "What to Wear to Interviews". The site also offers articles on current job trends, and "Job E-mail" (a service where candidates provide information about their skills and experience and CareerOne sends an e-mail when it has found a match with a listed career opportunity). Visitors are also able to create a cover letter and browse through newspaper job ads.
Hits: We liked the section that provided articles and reference materials for job hunters.
Misses: The site claims "Thousands of Internet and newspaper jobs await you!", but when we actually ran a few test searches, we found a lot of duplication with job hits. We were unable to get any hits at all for overseas jobs, but we are told this will soon improve when the CareerOne site links to the USA's CareerPath recruitment site, which should have happened by the time you read this.
Contact details: www.careerone.com.au, Ph: 02 9288 1792.

Employment

www.employment.com.au ●●

Number of Australian jobs currently listed? 4800 - 5000
Number of international jobs currently listed? The site is linked to the USA's www.careermosaic.com, therefore, the database is extensive.
Can you apply online? Yes.
Can you create and store your resume? No.
Search facilities: There are a number of search options to choose from. You can use the "classification browse" option, which includes 14 categories, or you can use the "keyword" option. This is by far the better path, since you can search by category, as well as by keyword, and how long ago the ad was posted.
Member benefits: The "direct.jobs" service is free but you must register as a member to qualify for it. It is a job matching application, which e-mails you daily with any adverts relevant to your specific job preferences.
Extra tools: The only extra tool on offer is the info chat line. You are notified of discussions, forums, and events online and both employees and employers are welcome to join in. However, sometimes there is no discussion running and you





must wait until another is posted.

Hits: The direct.jobs service is good, though not uncommon on other Web sites. Other good points about this site include the information given on employment and advertising, as well as the site map that offers a handy explanation of the site. You are also given the option of a salary search, a service that not many sites offer.

Misses: This site offers perhaps more effort than reward. You cannot build a resume, nor link to constant chat services. The job postings are not referenced and stored effectively. We also found the advice offered on the site is at best mediocre and not something we'd trust to help us find a job.

Contact details: www.employment.com.au, Ph: 02 9267 9244.

HotJobs

www.hotjobs.com.au ●●

Number of Australian jobs currently listed? Approximately 400.

Number of International jobs currently listed? In excess of 15,000.

Can you apply online? Yes.

Can you create and store your resume? Yes.

Search facilities: There are 22 categories available to choose from. Searches can be based on locations including capital cities, major metropolitan cities and international locations.

Member benefits: Members have access to the tools below.

Extra tools: Resumes can be stored online, plus users have access to a free Web-based e-mail account.

Hits: HotJobs has a good, clean layout, which is easy to navigate. You can use the resume builder or cut and paste your own resume into the site, prospective employers can then view your details online.

Misses: This site lacks the informative resources of sites such as My Career and Monster.

Contact Details: www.hotjobs.com.au, Ph: 02 8383 1677.

Job Find

www.jobfind.com.au ●●●

Number of Australian jobs currently listed? An average of 3500.

Number of international jobs currently listed? N/A.

Can you apply online? Yes.

Can you create and store your resume? There are no tools here for creating a resume, but there is a form that you can fill out when you apply for a job. This form acts like a resume, listing your personal details and your work history. You can lodge your resume with the site, and if an appropriate job comes up, the agency looking after the job will call you.

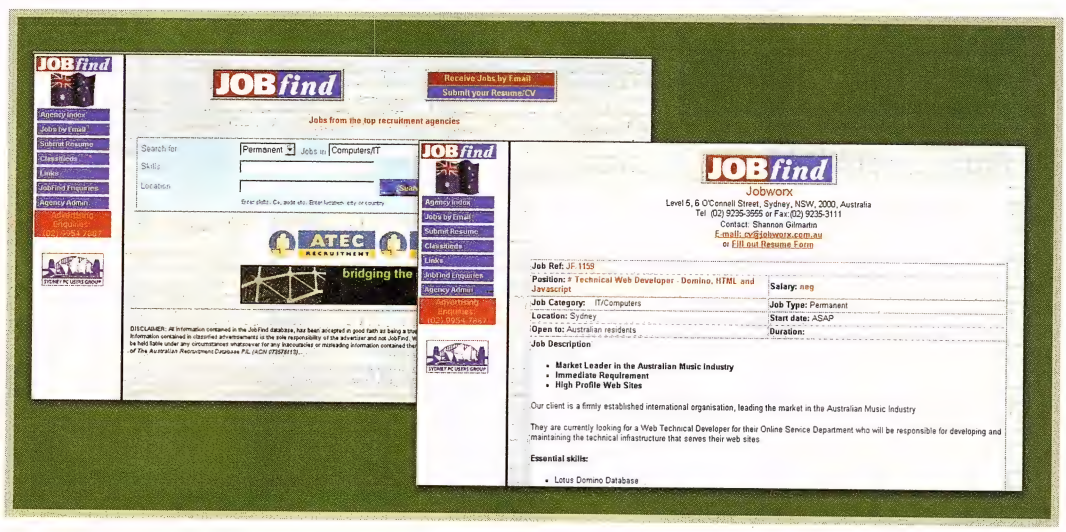
Search facilities: We found the search feature on the site inadequate. You can only choose very broad categories, such as Computers/IT, and list some skills such as Java or C++, and a location such as Sydney. At times, such a search brought up hundreds of hits which you'd have to search through one-by-one. There are 35 categories here to choose from.

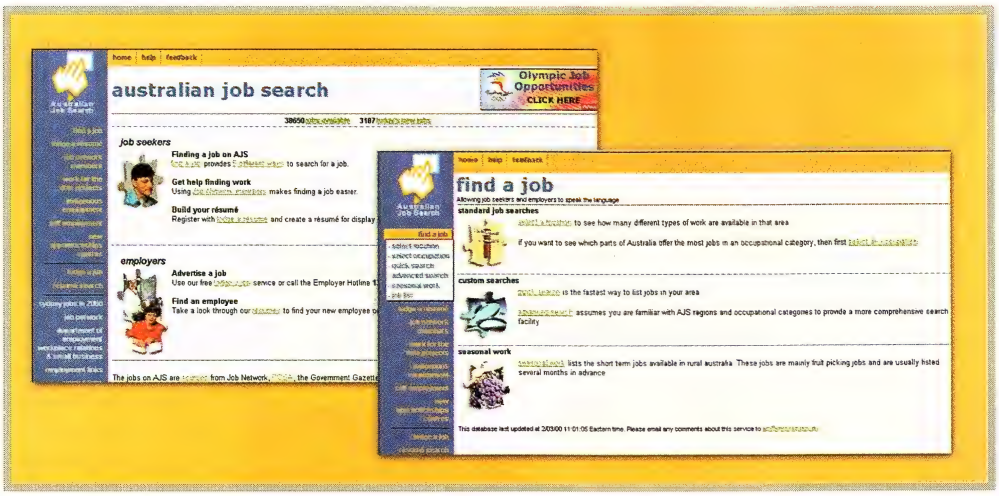
Member benefits: None, but you must register with the site in order to lodge your resume.

Extra tools: You can subscribe to free e-mail notification of new jobs in a certain category. There is also a section that lets you look at jobs posted by Agency.

Hits: There were a vast amount of IT positions listed on the site, we got a lot of hits. The site specialises in Australian and New Zealand jobs only.

Misses: Although a variety of categories are listed, the IT/Computer category was the only one working when we reviewed the site. The others returned results of





"Coming Soon". The site was also very basically designed.

Contact details: www.jobfind.com.au, Ph: 02 9954 7887.

Job Search

www.jobsearch.gov.au ●●●●

Number of Australian jobs currently listed? 38,894

Number of international jobs currently listed? N/A.

Can you apply online? Yes.

Can you create and store your resume? Yes. The site offers a template for easily creating your own resume. You can store it and send it to an employer when you apply online.

Search facilities: There are five different ways to search on this site. You can select a location and see exactly how many, and what kind of jobs are available there. The "Quick Search" feature is a fast way to find jobs in your area, while the "Advanced Search" gives you occupational categories to choose from and options such as searching for full or part time positions. You can also search a separate database of seasonal jobs.

The list of occupational categories available on this site is by far the most extensive of any we've seen—it includes all categories as defined by the Department of Employment. There are over 300 different job categories to choose from. There's also a new section for people looking for jobs at the 2000 Olympic games.

Member benefits: No, but you must register with the site in order to lodge your resume.

Extra tools: The site provides information on various Department of Employment initiatives such as the New Enterprise Incentive Scheme for those wishing to start their own business and the Work for the Dole Scheme. There are also links to government-run Websites Wage Net and the Australian Job Guide.

Hits: The site looks great, is very clear and provides many easy ways to look for a job. You can find jobs of all kinds, just about all the categories we could think of were covered on this site.

Misses: There are no tools such as chat facilities or e-mail notification of jobs.

Contact details: www.jobsearch.gov .au, Ph: 02 6121 6727.

Mills Harding

www.millsharding.com.au ●

Number of Australian jobs currently listed? 43

Number of international jobs currently listed? N/A.

Can you apply online? Only by e-mailing the recruitment officer in charge of the position.

Can you create and store your resume? No, you can only choose to send your resume to the agency.

Search facilities: There are no search facilities.

Member benefits: N/A.

Extra tools: N/A.

Hits: Mills Harding is a recruitment agency, and the only jobs they list online are the jobs available through them. People looking for Internet-related jobs will have the most luck here—all jobs on the site are strictly Internet related. The job listing gives you a thorough description of the job and gives you the e-mail address of the recruitment consultant dealing with that position.

Misses: There are not many jobs here to choose from.

Contact details: www.millsharding.com.au

Morgan & Banks

www.morganbanks.com.au ●●

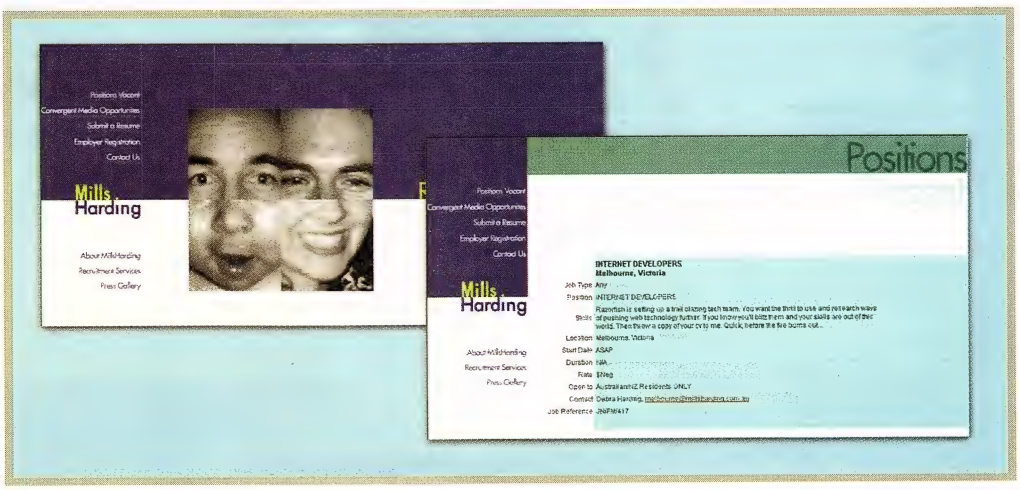
Number of Australian jobs currently listed? 1500 - 1550

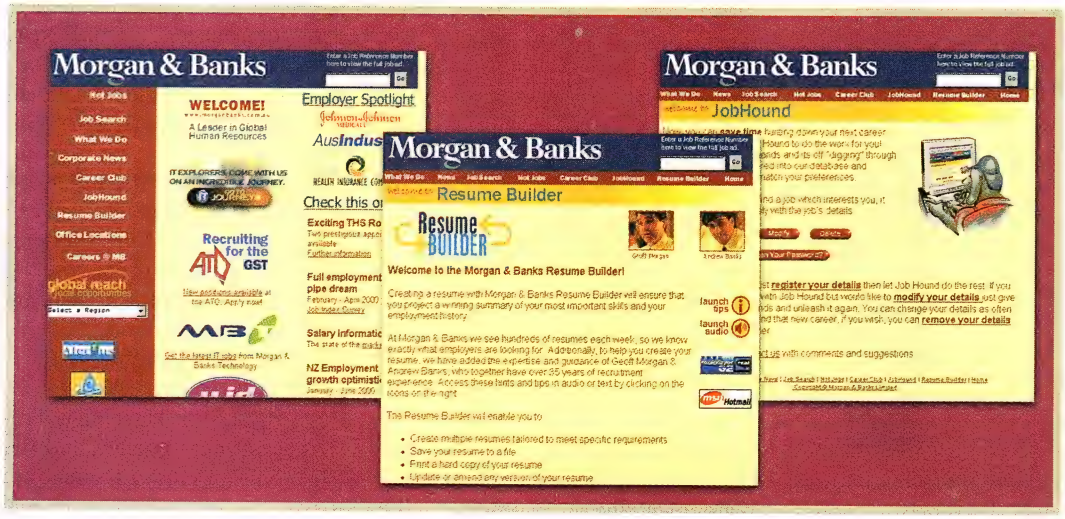
Number of international jobs currently listed? 300 - 400

Can you apply online? Yes.

Can you create and store your resume? Yes. Some helpful hints on resume building also make CV writing a trauma of the past.

Search facilities: There are 42 job cat-





egories.

Member benefits: There are two services available if you register, though interestingly you have to register separately for access to each one. The first is "Jobhound", which e-mails jobs of your preference to your e-mail address and the second is the helpful resume builder.

Extra tools: Through this site, you can link to the "Job Doctor" section of the Sydney Sunday Telegraph and the Melbourne Sunday Herald Sun. This means you can write in and ask questions, as well as comment on previous articles and discussions.

Hits: This is more of a corporate site and as such offers corporate news about Morgan & Banks. You'll also find information on working visas, interview advice, psyche tests, and recent survey results. You can also take part in these surveys by filling out the poll on the home page. The site looks very professional, add to this the links and international pages, and you have a good job search site.

Misses: This site is linked to www.monster.com.au. On its own, the Morgan & Banks job listings are not extensive.

Contact details: www.morganbanks.com.au, Ph: 02 9256 0333.

Monster

www.monster.com.au ●●●●●

PC MAGAZINE AUSTRALIA EDITORS' CHOICE

Number of Australian jobs currently listed? There are some 350,000 jobs on the Monster network worldwide.

Can you apply online? Yes.

Can you create and store your resume? Yes, your resume and cover letters.

Search facilities: There are 34 job categories to select from. You can search by capital cities and metropolitan areas.

Member benefits: Resumes and cover letters can be built and stored online; e-mails and articles are selected for your reading, depending on your interests.

Extra tools: Monster's Career Centre is full of useful information. You will find career advice, letter writing tips, industry information, quizzes and a virtual interview.

Hits: This site is well designed, easy to navigate and very informative. The site contains customised information about specific industries, including Microsoft professionals.

Misses: None.

Contact details: www.monster.com.au, Ph: 1800 650 250 (Australia), 0-800-MONSTER (New Zealand).

MyCareer

www.mycareer.com.au ●●●●

Number of Australian jobs currently listed? Between 12,000-15,000

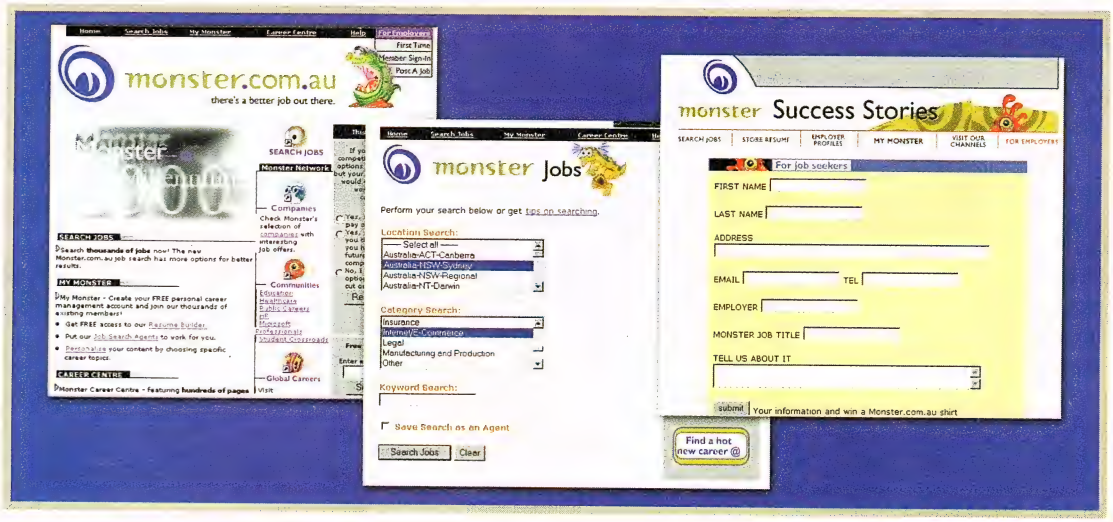
Number of international jobs currently listed? N/A.

Can you apply online? No.

Can you create and store your resume? No.

Search facilities: This site has 18 job categories to select from. Location is chosen by state.

Member benefits: Users are given a Web based e-mail address, an anonymous user profile (which can be viewed by recruitment agencies), "Job Alerts" e-mailed when a job of interest becomes available, the ability to save jobs for later review, and member chat forums.



Welcome to the...

REVOLUTION

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NetSuport Manager 5 takes the evolution of Remote Control Software to new heights. Not only can you View a users screen and Transfer Files, but you can View multiple users at the same time and Distribute Software directly to their desktops. The latest release includes Client Hardware and Software Inventory, a powerful Scripting Suite and blistering performance. Add to this full Audio and Multimedia support, Profiled Security, DES Encryption and the ability to Remote Control PC's from within your Web Browser, and you have the most portable, powerful and feature packed solution the market has yet to see.

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From corporation to home user, fast, secure remote control.

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Extra tools: MyCareer has a toolbox with a PAYE tax calculator, personal budget planner, retirement budget calculator, and cost of living calculator to name just a few. You will also find employment news and a link through to IT Jobs (strictly IT positions plus news and forums).

Hits: This site's appeal is its wealth of information. With helpful and articulate editorial on job seeking, interview preparation and tips, it is a helpful and informative source for employment seekers of any type.

Misses: You can't apply for jobs online.

Contact details: www.mycareer.com.au, e-mail: info@ mycareer.com.au

Seek

www.seek.com.au ●●●●

Number of Australian jobs currently listed? 22,552

Number of international jobs currently listed? 333

Can you apply online? Yes, you can apply online through an feature called Application Tracker, but you have to be a member to qualify for this service.

Can you create and store your resume? Yes. Resume creation tools and guides are available at this site.

Search facilities: There are 18 categories of job industries to search from.

Member benefits: Free services are available to members who register with this site. You can build a resume and you have access to the application tracker, as mentioned above. You can also receive notice of vacancies via e-mail. Once you have outlined your preferences, www.seek.com.au will send you any new vacancies which are relevant.

Extra tools: There are three main pages, the general jobseekers' page, the page for executives, and the page for graduates. An Interactive panel is found on the Careers Research page and this provides information and a forum for chat. You can be virtually interviewed, as well as see other people's best and worst answers to similar questions. There is a community centre where people's comments, input and advice can be added to or read, and there is also a page where you can e-mail an "expert" for personal advice. These services are joined by two more pages, one outlining the top 20 skills employers are looking for, and the other a "Create your own job" site.

Hits: This Web site is interactive and provides good information, ranging from company and employment consultants' profiles to career paths plans, choices and advertising deals. There is also an offer for a $20 gift voucher if you get a job through this site.

Misses: The pages are rather packed, so it can be difficult to know where to begin searching. While the information is good, there really aren't enough companies offering jobs on file. Also, the hints and advice in the interactive panel is difficult to read—it requires people to trawl through a heap of comments from a variety of sources.

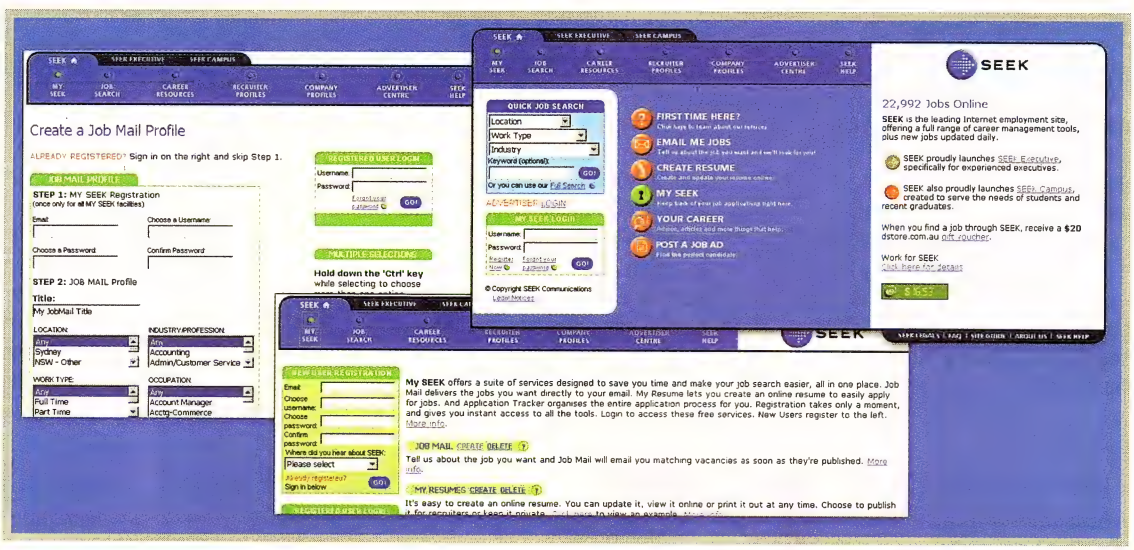
Contact details: www.seek.com.au, Ph: 1300 658 7000.

Top Jobs

www.topjobs.com.au ●●

Number of Australian jobs currently listed? 50 corporate clients only.

Number of international jobs currently listed? N/A.



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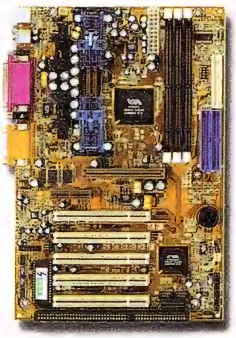


Norton AntiVirus: keeps all virus away from your PC
Norton Ghost: cure most technical support problems simply by rebuilding the entire Windows system

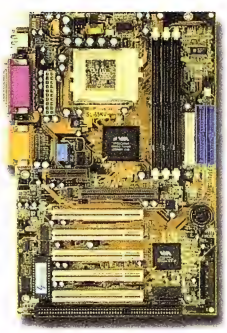


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- BIOS Vcore Setting
- BIOS Writing Protection



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- AGP 4X Mode
- Ultra ATA/66
- AC'97 Sound
- Hardware Monitor
- BIOS Vcore Setting
- BIOS Writing Protection

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HOW WE TESTED

Online Job Sites

We tested the sites by finding how many hits we could find for a position as a Java Programmer.

We used each site's search feature, and where applicable, chose the Advanced Search feature. We looked for a full time job (listed in the last 2 weeks). We conducted two tests for each capital city in Australia. One test involved searching for the keyword "Java" in the site's IT/computers job category, the other involved using the entry "Java programmer".

During testing we found that the search engines on the different sites worked in different ways, for example, while some sites found fewer hits for "Java programmer" than for "Java", many found more. On these sites, the search engine obviously finds jobs based on the keyword "Java" and jobs simply listing "programmer", instead of searching for the term "Java programmer".

Although we searched for jobs in Darwin, none of our searches produced any hits. Most sites allowed us to search for jobs in the capital cities, but some only let us specify which State to search in. These sites have been marked in the table below. We've listed the sites in the table, the letter "J" following the site name denotes the hits using the keyword "Java". The letters "JP" denote the hits for the term "Java programmer".

Please note, we could not perform this test on the Mills Harding site because there was no search engine, or on the Jobsearch.com.au site because the site only catered for financial, legal, administrative and marketing jobs.

Sites	Sydney	Brisbane	Melbourne	Perth	Adelaide	Hobart
Career One (J)	494	25	159	10	7	1
Career One (JP)	17	3	3	0	0	0
Employment (J)	28	0	2	0	0	0
Employment (JP)	5	1	0	0	0	0
HotJobs (J)	349	48	72	2	6	0
HotJobs (JP)	349	48	72	2	6	0
Jobfind (J)	99	2	36	1	1	2
Jobfind (JP)	176	3	63	3	2	2
Jobsearch.gov (J)	5	0	5	1	0	0
Jobsearch.gov (JP)	0	0	0	0	0	0
MillsHarding (J)	N/A	N/A	N/A	N/A	N/A	N/A
MillsHarding (J)	N/A	N/A	N/A	N/A	N/A	N/A
Morgan & Banks (J)	9	6	12	3	2	0
Morgan & Banks (JP)	1	0	1	0	0	0
Monster (J)	25	13	25	13	6	0
Monster (JP)	1	0	0	0	0	0
My Career* (J)	442	11	229	4	1	1
My Career* (JP)	762	44	441	11	2	2
Seek (J)	547	17	222	30	12	2
Seek (JP)	181	6	108	4	8	0
TopJobs (J)	4	0	0	0	0	0
TopJobs (JP)	4	0	0	0	0	0
Byron* (J)	40	10	70	7	9	0
Byron* (JP)	13	1	4	0	0	0
JobNet (J)	1263	79	431	74	27	1
JobNet (JP)	773	44	243	36	15	0
Jobsearch.com (J)	N/A	N/A	N/A	N/A	N/A	N/A
Jobsearch.com (JP)	N/A	N/A	N/A	N/A	N/A	N/A
Recruiters (J)	111	22	32	13	2	0
Recruiters (JP)	240	52	137	24	6	1

Job hits were correct at time of testing (22/2/00) *The state, not city, was chosen as location for the job

EDITORS' CHOICE

PC MAGAZINE AUSTRALIA EDITORS' CHOICE

•Job Site: Monster.com.au

•IT Specific Site: JobNet.com.au

Although there are many sites that offer great jobs and valuable tools for jobseeker, we found Monster.com.au contained the best mix of jobs on offer and tools to make the job hunting experience a more pleasant task. My Career was a close runner up, but we were dissapointed you could not apply for jobs online. JobSearch.gov must also be commended—no matter what field your in, this site will list a suitable job in any part of the country.

As far as IT specific job sites go, we liked Recruiters Online and JobNet. In the end we gave the Editors' Choice to JobNet for its great tools and hit rates.

Can you apply online? Yes.
Can you create and store your resume? No.
Search facilities: This site focuses mainly on managerial, professional, and technical roles (salaries of $50k plus). They also tend to focus more on the company looking for employees—they have a list of firms that are looking for people, and they direct these prospective employees directly to the company.
Member benefits: None.
Extra tools: The site includes information pages like "Effective Resume Tips",



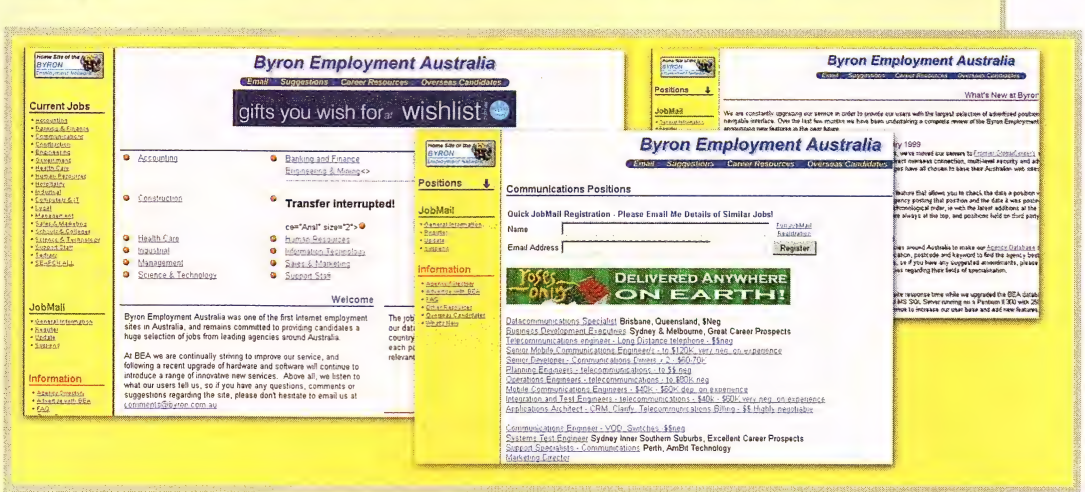
"Career Planning", "Test Your Skills", and "Winning at the Interview". You can also sign up for e-mail notification direct from the company you want to find employment with.

Hits: None.

Misses: Very few job hits. Navigating the site can be confusing at times.

Contact details: www. topjobs.com.au, Ph: 02 9460 1111. PC

IT Specific Sites



Byron Employment

www.byron.com.au ●●●●

Number of Australian jobs currently listed? 15,000

Number of international jobs currently listed? A few hundred.

Can you apply online? Yes.

Can you create and store your resume? No.

Search facilities: You can search 18 categories by state. Byron has over 2000 employment agencies advertising on their site, therefore there are a large number of positions available.

Member benefits: None.

Extra tools: You can have the JobMail feature send you a regular e-mail containing jobs that satisfy your criteria.

Hits: Byron Employment is a great example of pooled resources, it lists jobs from a number of other sites too. Byron Employment is a no-fuss, position-listings-only site.

Misses: No member benefits, resume builder or cool tools.

Contact details: http://employment.byron.com.au, e-mail: comments@byron.com.au

PC MAGAZINE AUSTRALIA EDITORS' CHOICE

Job Net

www.jobnet.com.au ●●●●●

Number of Australian jobs currently listed? 16,694

Number of international jobs currently listed? About 10 percent more than the Australian jobs figure.

Can you apply online? Yes.

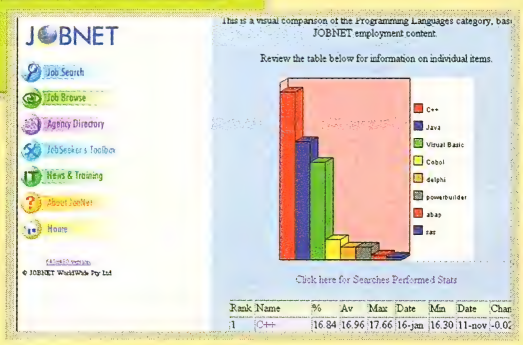
Can you create and store your resume? You can paste your current resume onto the website in its entireity.

Search facilities: Job categories are entered by the user when searching the site (using Boolean search terms).

Member benefits: Members can get e-mail alerts sent to them, and they can announce their availablility to recruitment agencies. You can also keep your resume online.

Extra Tools: Daily Email Alert (have all new jobs that match your skills e-mailed to you automatically each day). A new service called Jobstats gives you an up-to-the-minute account of what kinds of jobs people are looking for in Australia. And if you're really curious, you can check





Hits: Statistical and legal news is displayed as well as some basic interview tips, but the main advantage is for the employer. The consultancy guarantees that if the employee proves inadequate within 100 days of placement, the agency will find a replacement free of charge (minus the advertising costs).

out Jobspy, which gives you a peek at what people are searching for right now.

Hits: The site is fairly easy to navigate and provides all the basics for the job seeker that knows what he/she wants.

Misses: We're not sure how accurate the search facilities on this site are. With nothing in the location field on a quick search, we got 858 job matches for "Java Programmer" however, when we entered Australia into the location field, the number of hits dropped below that of even a Sydney-only search!

Contact Details: www.jobnet.com.au, Ph: 02 9288 1792

Job Search

www.jobsearch.com.au ●●

Number of Australian jobs currently listed? 15-20

Number of international jobs currently listed? N/A.

Can you apply online? Yes.

Can you create and store your resume? No.

Search facilities: There are only financial, legal, administrative and marketing jobs on offer and you must scroll down to find them—there are no search facilities. The site also only lists work in the Northern Territory and Western Australia.

Member benefits: N/A.

Extra tools: N/A.

Misses: There is no search engine and there are few job listings, even for the limited categories they cater to.

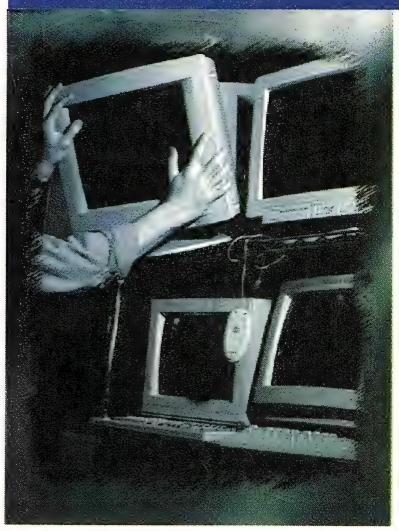
Contact details: www.jobsearch.com.au, Ph: 08 9481 1707.

Recruiters Online

www.recruitersonline.com.au ●●●●

Number of Australian jobs currently

When there's more room on your hard drives than your Desk.



As the number of PCs you use increases, so does the hardware on your desk. Two machines. Two keyboards, two monitors, two mice. Three machines. Three keyboards, three monitors, three mice. Four machines? Another desk ...

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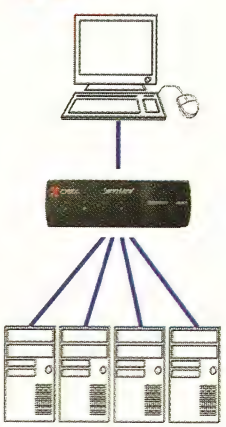
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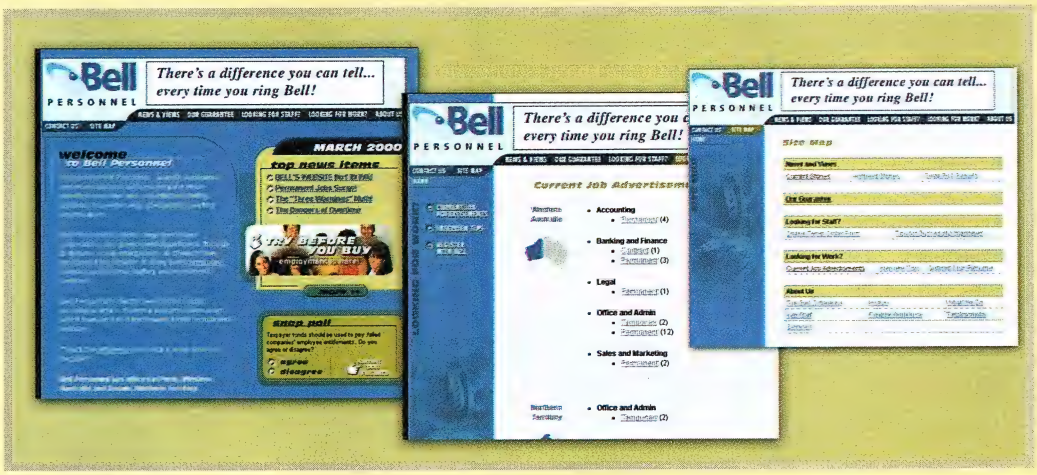
CYBEX COMPUTER PRODUCTS INTERNATIONAL



If you're looking for **IT jobs** in the newspaper, there may be around **20,000** positions you've **missed!**



www.jobnet.com.au JOBNET



greeted by jobs that you might be interested in.

Extra tools: N/A.

Hits: This is a well designed site with many IT jobs listed. It contains all the jobs from six of the largest IT recruitment agencies in Australia and New Zealand.

Misses: There were no extra tools, such as a resume builder, to help you with your job seeking.

Contact details: www.recruiteronline.com.au PC

listed? 4000

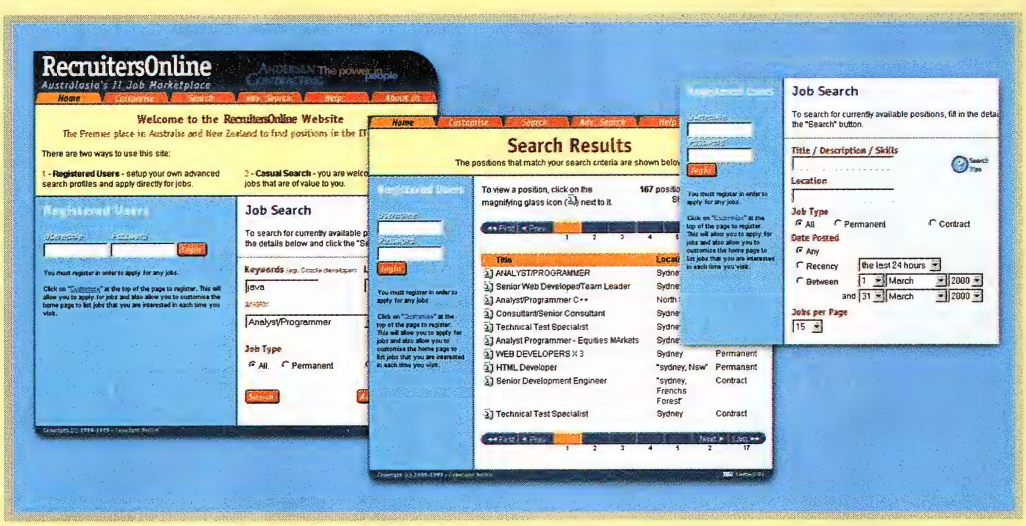
Number of International jobs currently listed? N/A.

Can you apply online? Yes.

Can you create and store your resume? Yes. The site offers a template for easily creating your own resume. You can store it and send it to an employer when you apply online.

Search facilities: You can do a casual search, choosing your location, a keyword, and, if you like, a sub category such as "COBOL" or "Novell". An advanced search is also available that lets you set a search according to how recently a job was posted.

Member benefits: You must register to apply for a job. Registering also lets you customise a home page so that each time you visit, you are



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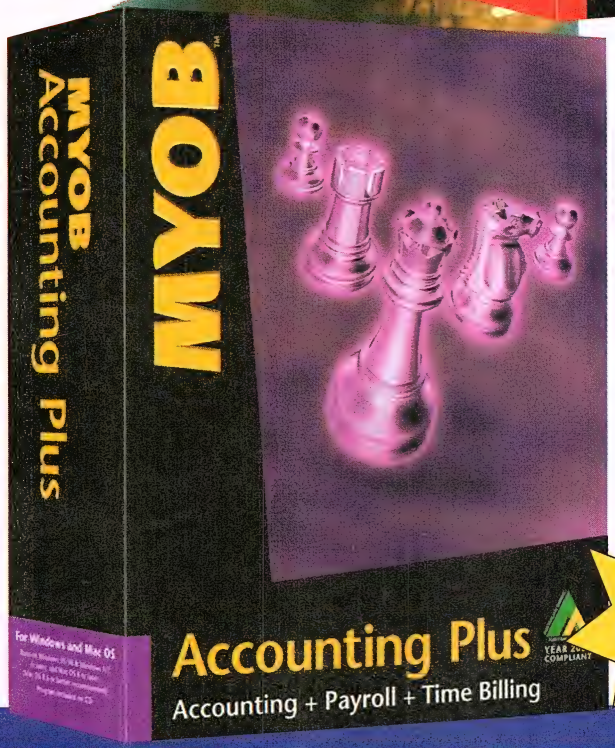


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FINANCIAL SOFTWARE

SOHO ACCOUNTING PACKAGES

BY STEVEN TURVEY

IMAGES BY PHOTODISC

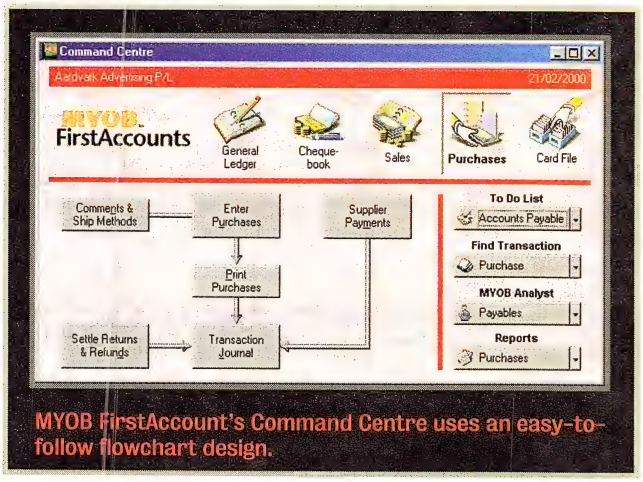


There is a definite market need for accounting packages aimed squarely at the SOHO market. It's not at all uncommon for Mary and Joe Bloggs to decide to set up their own small consulting business to be run from home or a small office suite. And, given the "lean and mean" structure of most small companies it is a bit much to expect either of the partners for example to have in-depth accounting knowledge or be able to hire a dedicated accountant on their initially modest cash flow. Even a part-time accountant may be just enough to tip the scales and have the small or fledging company haemorrhaging dangerously.

While it's true that you do not really have to have a dedicated accounting package—a friend of mine has his own small but very active company with a diverse array of services and with minimal accounting experience runs the whole show from Microsoft Excel—they can certainly help ease the load. That is, of course, if they are easy enough to use and can prompt and lead the user with simple English rather than Accountant-speak.

Oh, and let's not forget the GST. Your company needs to keep track of the GST you pay on incoming goods and services and then, in turn, the charges you apply on the services you supply. At the end of the day the GST debt to the government must be tallied up and paid. All of the packages we tested are GST aware and assist to varying degrees in its administration.

As a consequence our filter for the packages targeted in this comparison was quite simple: the package must be easy to use and not require an accountancy degree to drive.



MYOB FirstAccount's Command Centre uses an easy-to-follow flowchart design.

MYOB FirstAccounts

Distributor: MYOB Australia, Ph: 02 9970 9014.
RRP: $199

Install Software installation was very simple indeed, the CD auto-ran and the subsequent install was a straightforward Windows installation.

Configuring the software for your company is a 10-step process which was again quite simple and straightforward. To its credit, when setting up your company details, the configuration process flags incorrect formats for say the ACN or ABN—most packages do not check the fields format.

The default financial year is July to June but this can be customised as we did for our tests because the RMIT financial year mimics the academic year and runs January to December. Another plus during configuration is the ability to base your intervals at twelve per year; that is, monthly, or as some companies do, run 13 intervals per year with each interval running precisely four weeks.

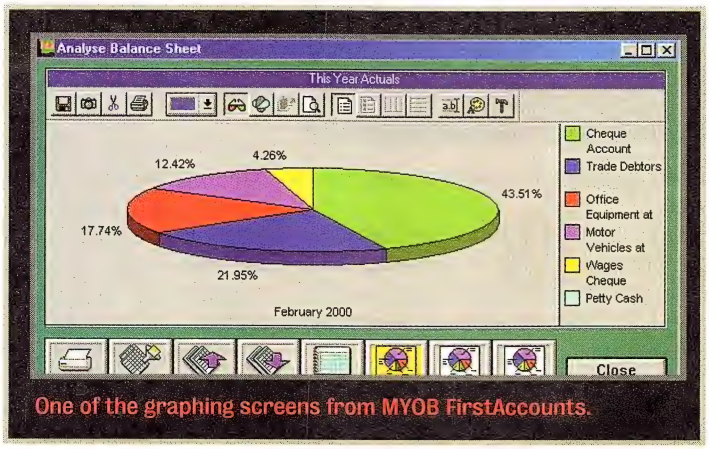
MYOB makes selecting the right account structure for your company very easy with an enormous list of company types which includes video store, vet, dentist, wholesale, and agriculture, for example. We chose consultancy for our exercise.

We were also able to customise the software to include "easy fill-in" a feature similar to Excel or Netscape Navigator for example where MYOB will suggest the remainder of the entry based on previous entry names. We also chose to include variable-sized rather than fixed-sized data fields.

Interface Upon running MYOB the user is presented with a neat and logical graphical interface that features five function buttons, each with a corresponding flow chart. The flow charts are a great help to someone who is not conversant in "Accounting-speak" as each of the boxes are labelled in clear, layman's terms and the arrows leave no doubt as to the order of execution. To perform a particular function such as "Print Purchases" the user simply clicks on the respective box in the flow chart. The top row of five buttons include general Ledger, Chequebook, Sales, Purchases and Card File.

Running down the right side of the flow chart are a set of "smart" drop down menus labelled To Do List, Find Transaction, MYOB Analysis and Reports. Depending on which of the main functions is selected the menus change to reflect the function.

This style of interface, which is very



One of the graphing screens from MYOB FirstAccounts.

Editors' Choice

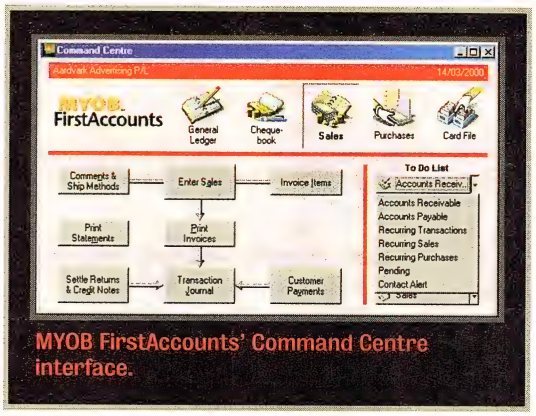
• QuickBooks Pro Version 7

In the SOHO accounting market it appears to be a "battle royale" between MYOB and QuickBooks at the moment. In our opinion you are looking at between $350 and $500 for well-rounded SOHO accounting software. Below this amount there appear to be a few corners cut as far as features are concerned.

Sadly we did not have an exact head to head as far as QuickBooks Pro and MYOB are concerned—we received the more expensive MYOB Accounting Plus rather than the more comparable MYOB Accounting. However, it appears that the only difference in the two MYOB offerings is the addition of some extra reports, Payroll and Time Tracking and Billing in the "Plus" version.

Even so, we feel that QuickBooks Pro Version 7 deserves the Editors' Choice, its user interface is just that tiny bit easier to navigate and use than MYOB and streets ahead of many of the other packages we looked at. There was also a host of features that grabbed our attention and made the overall task of bookkeeping just that little bit simpler. These included the dynamic reports where a confusing item can simply be clicked on to bring up its history and details, none of the other packages offered this flexibility.

Although outside our original testing requirements of the two SME packages tested, if we had expanded our target, the nod would have to go to Pastel Partner 5 Ultra for its power and ease of use.



MYOB FirstAccounts' Command Centre interface.

similar to QuickBooks's by the way, is certainly the most user-friendly we have seen and fits in well with the packages target audience.

■ **Documentation** Documentation for this package is, in a word, superb. We have rarely seen documentation as good as this. The large 474-page User Guide has a detailed table of contents; each chapter is tabbed and has its own detailed table of contents and there is a very detailed index at the rear. The User Guide is well laid out with very easy to read text and clear diagrams and screen shots and, for the nervous novice, the first chapter is entitled "Your First Day" which is then followed by a 47-page tutorial in the second chapter.

■ **In Use** Let's be clear about this: MYOB FirstAccounts is very easy in day-to-day use, but of all the packages reviewed we found it to be the least accomplished. FirstAccounts was really designed for service based industries only, so you won't find inventory functions that even QuickBooks supports. However, there are four main accounting packages in the MYOB suite and the next one up, MYOB Accounting, at $399 does include inventory functions.

The package will certainly handle a small business's books but do not expect many bells and whistles. For example, FirstAccounts does have a reasonable array of reports, 80 in total, and GST is amongst them. However, the GST report will quite happily display the tax you have collected and that you have paid but the next rather simple step—how much tax you owe—is not calculated for you (QuickBooks does this).

All your standard tasks like customer management, invoicing and purchasing are handled quite well but you do not get some of the neat little shortcut buttons such as the "Pending" button in sales, a feature supported by Accounting Plus.

With reports such as Profit & Loss and Balance Sheets you are provided with detailed information; up and down arrows are used to expand or contract categories. For example, you can simply have the total of you current assets displayed or you can show it broken down into petty cash, trade debtors, and the like. However, the facility to double click on your sales for the month in your profit and loss statement and open a window displaying all the sales is not available.

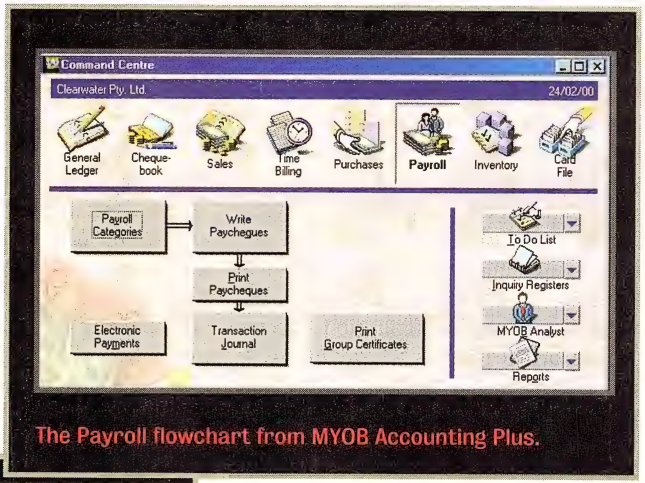
Time and billing are not available but the package is able to generate P&L statements for individual jobs and job budget analysis, but job estimating is not one of its features.

■ **Conclusion** For anyone starting off their own small service based business, with the emphasis on small and with limited accounting knowledge, MYOB FirstAccounts would be a darned good starting point. Admittedly, if your company grows you will probably need to upgrade to, say, MYOB Accounting. If you sell a product and need to keep an inventory then FirstAccounts is definitely not for you.

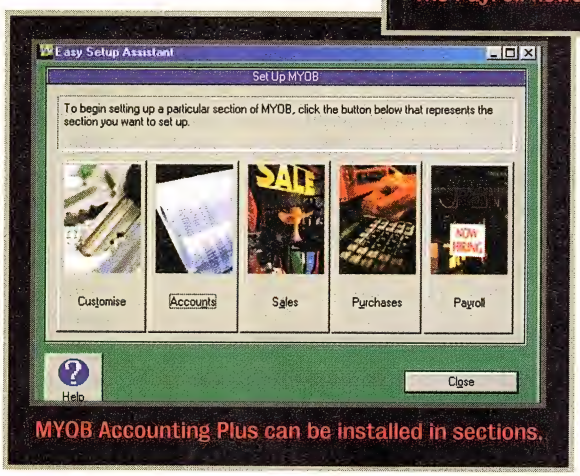
MYOB Accounting Plus

Distributor: MYOB Australia, Ph: 02 9970 9014.
RRP: $525

MYOB Accounting Plus is a couple of levels above FirstAccounts and while the latter is designed to handle a small business of up to three employees, Accounting Plus can happily cope with up to 30 employees. In addition, Accounting Plus includes enhancements and additional features (such as Payroll) that we did not test.



The Payroll flowchart from MYOB Accounting Plus.

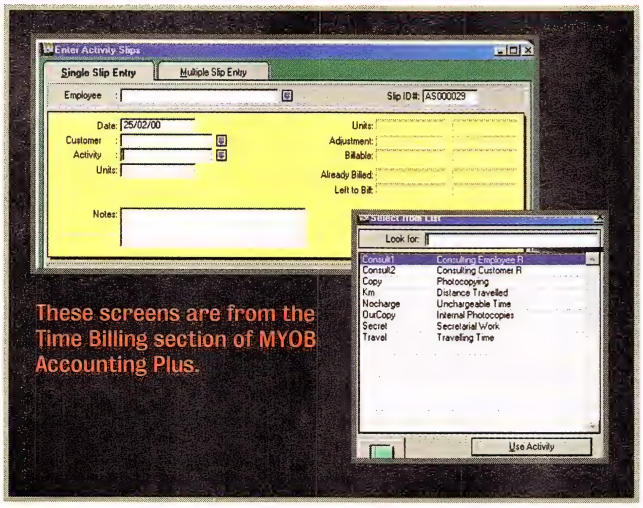


MYOB Accounting Plus can be installed in sections.

■ **Install** MYOB Accounting Plus software installation is similar but includes additional features such as OfficeLinks' to Excel, Word, Corel WordPerfect and Small Business Tools for Office.

When starting for the first time, the user is presented with an "Easy Setup Assistant" window the extra features and complexity of Accounting Plus requiring this additional step above and beyond FirstAccounts. Each of the buttons elicits a simple step-driven question and answer process for example if Customise is selected the user is presented with options to configure the underlying workings of the software such as "print packing slips when invoices are printed" or "apply customer payments automatically to oldest

invoices first". There are, of course, useful defaults (that can be changed if you wish) to warn if customers have an outstanding credit before payment. Aging, which by default is 30, 60, and 90 days, can be set to monthly if required. While the software configuration steps are more long-winded than FirstAccounts they were nevertheless drama free and even the most accounting-fearful among us will not be put off by the terminology used.



These screens are from the Time Billing section of MYOB Accounting Plus.

■ **Interface** There is not a lot to say about the interface, as it is functionally identical to FirstAccounts' but more function rich.

■ **Documentation** Again, in common with FirstAccounts, documentation is absolutely brilliant. There are three manuals in total all with the same attention to detail and layout as FirstAccounts' manual. The first manual, the User Guide, totals 462 pages and, while it is not quite as friendly as FirstAccounts' User Guide (it launches straight into the guts of General Ledger forgoing the handholding of "your first day" and the "tutorial" chapter), it is nevertheless an easy and informative read.

Where you do find the handholding is in the Getting Started Guide, a separate 144-page tome that includes a comprehensive guide to the setup procedures and a 65-page tutorial chapter. The final bookshelf filler is the Professional Time Billing and Payroll Guide totalling 170 pages, which most importantly contains the chapter "Paying your Employees".

■ **In Use** MYOB FirstAccounts' features are a subset of Accounting Plus' and as they both utilise the same control structure the latter, even with its additional power, is just as easy to drive as FirstAccounts. In some respects, as we mentioned for the previous package, Accounting Plus's actually a little easier to use, with the added features in some cases speeding up or automating processes.

Given the substantial difference in price between FirstAccounts and Accounting Plus you would justifiably expect a significant increase in features above and beyond just streamlining a few processes. And you do get it. Accounting Plus includes Payroll, Inventory, and Time Billing. The time billing is particularly useful for our consultancy scenario and in MYOB it is quite simple to use. The employee, client and projects are all maintained in databases, which can be accessed via the drop down menu button at the side of the relevant fields. This cuts down on the input time—a bugbear for many employees who constantly grumble at the time wasted with timesheets in general.

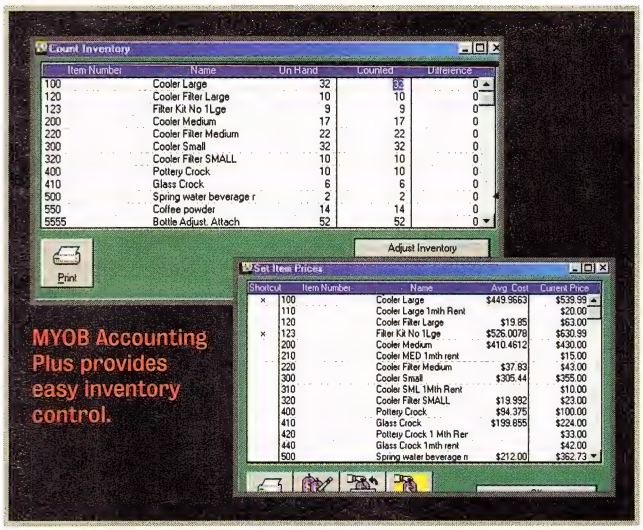
With your staff utilising the electronic timesheets, it's a simple matter to look up a projects time log and then generate invoices. Invoice generation is just as simple as FirstAccounts and does include the option to select between various styles when printing an invoice.

The other useful feature, particularly if you are not just a service provider and must therefore maintain stock, is the Inventory. The inventory has all the standard features you would expect and enables your company to keep track of item quantities and transfers. Pricing control of your stock is also another important concern and MYOB does not let you down in this regard. The data is displayed with the current price and either the average buy price/cost or the last buy price/cost. A shortcut button allows the user to apply pricing shortcuts to all the inventory items or selected items.

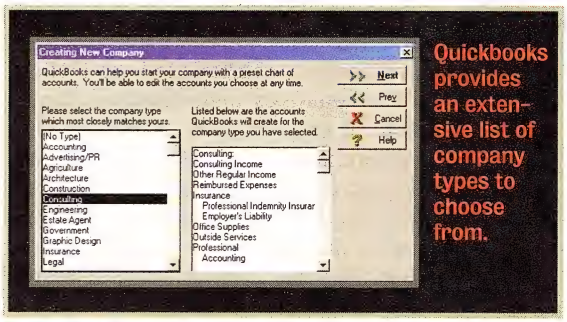
You can apply pricing rules such as percentage margin, percentage markup, make price end in, and rounding to name a few. In this regard MYOB Accounting Plus is more flexible and sophisticated than QuickBooks Pro that simply includes the option to mark up an item's price by a percentage value based on either the current sale price or unit cost.

Accounting Plus' reporting is more robust than FirstAccounts' and includes an additional 50 reports on top of the latter's 80.

■ **Conclusion** With the exception of payroll, MYOB Accounting Plus is pretty much a head to head product on a feature basis with QuickBooks Pro although straight MYOB Accounting would be a better match. The package below Accounting Plus is MYOB Accounting, which we did not receive to test, and while less expensive then Accounting Plus does lose the time billing feature as well as payroll and as a consequence both products bracket QuickBooks Pro.



MYOB Accounting Plus provides easy inventory control.



Quickbooks provides an extensive list of company types to choose from.

QuickBooks Pro 7

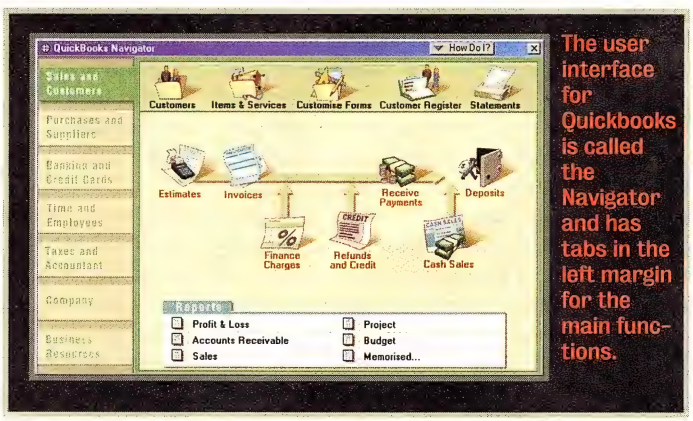
Distributor: Reckon Software, Ph: 1800 674 888. RRP: $349.95

Install The software installation is typical of a Windows application and generally painless. Our software key provided the Lab with a 5-user licence—unlike some other accounting packages, QuickBooks Pro is quite painless to upgrade from single user to multiuser installation. Adding additional users is also very easy.

We did have one minor problem with the installation (bear in mind that the software we received was a pre-release version). During installation QuickBooks installer detected a potential conflict with our network software, Windows 98SE and Novel Netware Client V3.1, and suggested we refrain from clicking on "Browse" to select a different installation directory. Naturally, one of our staff ignored the warning and, to our surprise, the installation proceeded without a problem.

Upon starting QuickBooks for the first time the user is presented with five options. If unfamiliar with the software they can run a simple introduction or open a sample company's data. For the initiated, the options are setup a new company data file, open an existing QuickBooks Pro data file or convert a Quicken data file.

To setup your company's data QuickBooks employs an "interview" technique where you are asked specific questions and your answers effectively input the relevant data—pretty simple and far from intimidating. When it comes to selecting the type of company you are presented with a good list of options—25 in all. Though this is not as extensive as MYOB, it is nevertheless a good deal better than say Sage Instant Accounting 98. But to QuickBooks' credit, when an option is selected a small window displays the accounts that will be created for this option. From the list we were able to select "Consulting" which set up our books with a useful spread of accounts. Initial accounts setup is one of the easy we have seen and includes a prompt to configure QuickBooks for handling Web Connect Data for downloading data from your financial institutions Web site.



The user interface for Quickbooks is called the Navigator and has tabs in the left margin for the main functions.

Interface The user interfaces of MYOB and Quicken are very similar and while MYOB's have a clean and perhaps less-cluttered look, QuickBooks icons are arguably more personal and friendly.

The user interface is called the QuickBooks Navigator and has tabs down the left to select the broad financial activity, which then dictates the editing buttons along the top row, and the specific financial activities in the flow charts. Whenever an activity is selected the user is presented with a concise help window and almost every one of the child windows that open include this feature and a "How Do I" button that explains how to setup and use this feature—very user friendly.

At the very base of the Navigator you will find an array of reports that again vary with the currently selected broad activity.

Documentation The software provided to the Lab was a pre-production sample and did not include the user documentation.

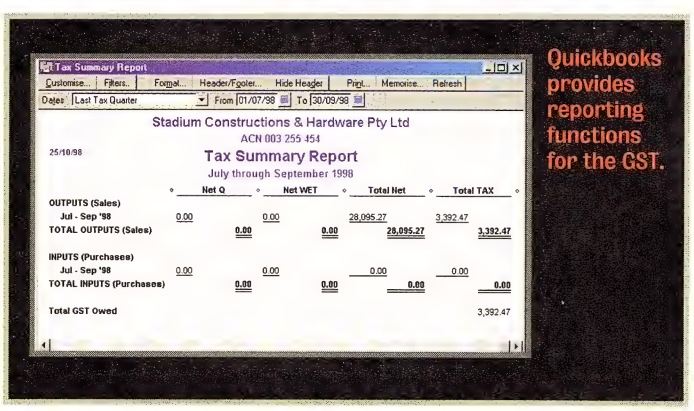
In Use Each time QuickBooks is started, a small reminder window opens with a list of due dates, account description and the amount complete with the previously mentioned "How Do I" menu to enable quick setup of specific options, for example.

We found manipulation of client and item data to be very simple and the production of invoices was enhanced by a very simple graphical forms editor/designer. It's a very simple matter to alter the standard forms and insert your own fields and logo for instance.

If your bank provides the appropriate on-line facilities, QuickBooks can reconcile your banking over the Internet (however, internal modems are not supported and an external modem is required).

Generation of reports is quite straightforward with the added benefit that if you are unsure of say an item in your profit/loss report double clicking on the item will provide a detailed breakdown. GST can also be tracked and one of the reports summarises sales and purchase GST and then reports the amount owed.

Assets are handled reasonably well



Quickbooks provides reporting functions for the GST.

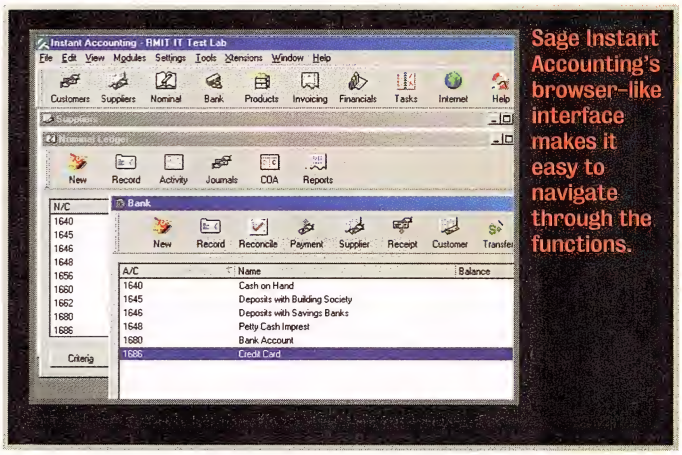
SUMMARY OF FEATURES

Financial Software

■ Yes ❑ No

PC MAGAZINE AUSTRALIA EDITOR'S CHOICE

Name	FinancePlus 3.08	MYOB FirstAccounts V3.1	MYOB Accounting Plus 9.1	Pastel Partner Ultra V5.1	QuickBooks Pro V7	Sage Instant Accounting 98
Distributor	FinancePlus Software	MYOB Australia	MYOB Australia	Pastel Accounting	Quicken Australia	Sage Distribution Australia
List Price (inc. tax)	3 users - $6100	$199	$525	$2595	$350	$299
Address	Level 5, 77 Berry St North Sydney 2060	4 Solwood Lane Blackburn 3130	4 Solwood Lane, Blackburn 3130	3 Grosvenor St Neutral Bay 2089	63 Pyrmont Bridge Rd Camperedown 2050	66 Bannister Road Canningvale 6155
Phone number Fax number	02 9922 4866 02 9922 6188	02 9970 9014 02 9770 9088	02 9970 9014 02 9770 9088	02 9909 1588 02 9909 3688	1800 674 888 02 9562 7934	08 9455 4477 08 9455 4611
Internet	www.financeplus .com.au	www.myob.com.au	www.myob.com.au	www.pastel.net.au	www.quicken .com.au	www.sage-aust.com.au
GST & REPORTING						
GST functionality	■	■	■	■	■	■
Information for business activity statements	■	■	■	■	■	■
Management and financial reports (total no.)	40+	80	130	197	90	70
Customisable reports	■	■	■	■	■	■
ONLINE BANKING						
Banking	V.3.1	❑	❑	■	■	❑
Automatic transaction reconcilliation	❑	❑	❑	❑	■	❑
Electronic bill payment	V.3.1	■	■	■	BPAY - ❑, Payroll EFT - ■	❑
DAY-TO-DAY ACCOUNT MANAGEMENT						
Print and record invoices	■	■	■	■	■	■
Customise invoices and statements	■	■	■	■	■	■
Invoicing	■	■	■	■	■	■
Progressive invoicing	■	■	■	■	■	■
Produce and record cheques	■	■	■	■	■	❑
Accounts receivable	■	■	■	■	■	■
Accounts payable	■	■	■	■	■	■
Flexible chart of accounts	■	■	■	■	■	■
Job costing and budgeting	■/ Optional	■/■	■/■	■/■	Advanced	❑/■
Produce and record purchase orders	■	■	■	■	■	❑
Integrated inventory management	■	❑	■	■	■	❑
Audit trail	■	■	■	■	■	■
Automatic data backup reminder	❑	■	■	■	■	■
Multiple years	■	■	■	■	■	❑
Find/search facilities	■	■	■	■	■	■
Integrated estimating, quoting and billing	Job Costing V.3.1	■	■	■	■	❑
Time tracking and timer	❑	❑	■	❑	■	❑
Assets management	❑	❑	❑	■	❑	❑
Foreign currencies	■	❑	❑	■	❑	❑
PAYROLL						
Integrated Payroll	❑	■	■	❑	❑	❑
Choice Super management	❑	❑	■	■	❑	❑
Pay slips	❑	❑	■	■	❑	❑
Electronic group certificates	❑	❑	■	■	❑	❑
MISCELLANEOUS						
Annual support cost	From $980	$140 (1 year) $210 (2 years)	$255 (1 year) $385 (2 years)	$360 - $850	10-incident $200	$75
Multiuser (cost per extra license)	■ - $600	❑	❑	$700(5) to $8000(20)	$169.95	❑
Number of user licenses incl.	Min. 3 users	1	1	5 to 20	1	1
Preferred hardware requirements (CPU, RAM, HDD space)	Pentium processor (or equivalent) @ 200MHz, 32MB RAM, 40MB free HD space	Pentium processor (or equivalent) @ 166MHz, 32MB RAM, 20MB free HD space	Pentium processor (or equivalent) @ 200MHz, 32MB RAM, 200MB free HD space	Pentium processor (or equivalent), 32MB RAM, 500MB free HD space	Pentium processor (or equivalent), 32MB RAM, 90MB free HD space	Pentium processor (or equivalent) @ 133MHz, 32MB RAM, 40MB free HD space



Sage Instant Accounting's browser-like interface makes it easy to navigate through the functions.

but as with most of the packages we looked at depreciation must be manually calculated, there is no option to simply input a percentage and have the package calculate it for you.

A job estimate can be quickly created in QuickBooks and with the daily/weekly activity time sheets QuickBooks provides project time and cost tracking that allows the user to compare actual costs to estimates and hone future quotes. QuickBooks also enables the user to compare the profitability of various projects. Although not exactly swimming in graphical reports QuickBooks does include a fair set with the likes of Income & Expenses, Sales and Accounts receivable represented in clear bar or pie charts.

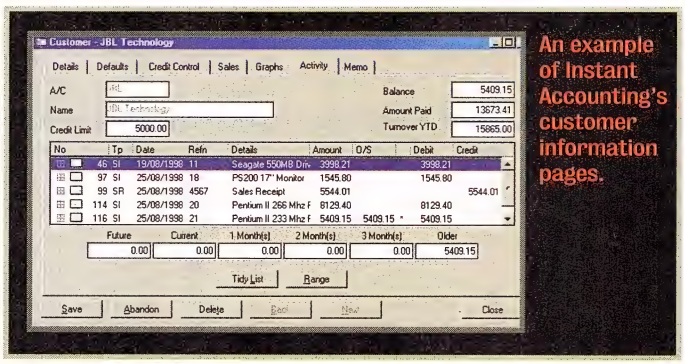
■ **Conclusion** For the vast majority of accounting tasks that a SOHO might need QuickBooks Pro 7 is extremely simple to use with one of the best user interfaces we have seen.

Sage Instant Accounting 98

Distributor: Sage Distribution Australia, Ph: 08 9455 4477. RRP: $299

■ **Install** The Sage CD did not autorun and, more to the point, the instructions for installation on the CD case were incorrect. The instructions for installation are to use the Start menu and its Run option, then type in D:\setup. There is in fact no setup.exe on the CD, the actual filename is cdsetup.exe. Our retail version unfortunately did not arrive with a CD key either. Apparently some early samples went out with the misprint and without a CD key but apparently Sage Distribution Australia have corrected both items.

Otherwise software installation was straightforward and uncomplicated. Upon startup the user is presented with the option of importing data or creating new accounts. If you choose the latter you're presented with a list of business types that is by no means as extensive as say MYOB but the ten preset options (such as Medical Practitioner or Building Trade, for example) should keep most happy. There is an eleventh option for the intrepid accountant that wishes to customise the account layout. We opted for the first option "Solution 6 Chart of Accounts" as there was no "consultancy" option.



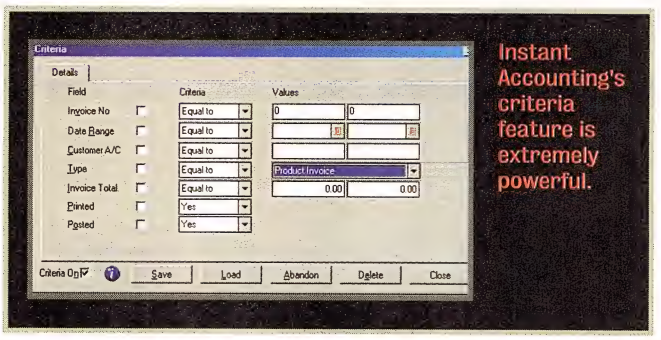
An example of Instant Accounting's customer information pages.

Sage then creates your books and launches into a long and detailed question and answer setup Wizard. The wizard can be completed in more than one sitting if desired, as there are quite a few steps along the way where the user can save the partial setup and continue on at a later date. Most items that are input at this stage can be changed or corrected later; the only exception is your financial year start date. It is during this setup process that any internal "cost centres" or departments are configured to allow reporting on individual departments to focus your accounts analysis.

■ **Interface** The button bar is located just below the menu and features eleven large, easy-to-read icons. Unlike most of the competition selecting more than one module from the button bar results in cascading windows whereas most of the competition generally only have a single module window open at a time. Selecting multiple items is easy—there is no need to shift-click, simply click on the items one after another and they stay selected (a second click will deselect an item). However, the package is not consistent; for example when we were creating a new report and had to select multiple fields, we had to resort to shift-click, which was quite annoying.

Most of the child windows have an information icon that summons a description of the window and its function, sort of a shortcut to "help" and quite convenient. Instant Accounting does feature help wizards represented by a small red wizards cap with yellow stars but they are really only implemented for creating new items. For example, there is none in the invoicing window because it is expected that you create invoices regularly and do not need help. Go to the Bank window, however, and you will find a wizard to help create a new account; a perhaps uncommon occurrence. Unfortunately, once you embark on a wizard you have no idea how many steps it will take which is a minor oversight.

■ **Documentation** Admittedly, Instant Accounting is not as complex as some of



Instant Accounting's criteria feature is extremely powerful.

HOW WE TESTED SOHO ACCOUNTING SOFTWARE

The accounting packages were tested on a Pentium II 300MHz PC with 128MB of RAM, Hercules TNT graphics card and a 27MB Maxtor hard drive under Windows 98SE.

To test the packages ease of setup and usability a subset of the Test Labs accounts were input into each package. The software was configured for a consultancy business or the next closest option offered by the software under test. We also configured the software for GST and inventory functions if applicable.

Once installed we performed a range of functions that included, but were not limited to the following:

- Create new customers.
- Modify customers.
- Invoice customers noting any reporting for overdue accounts and output options and styles.
- Pay a client and producing a cheque
- Bank reconciliation
- Inventory—adding and modifying stock items and details.
- Annual profit/loss and Balance Sheer reports.
- Assets & Liabilities handling.
- Depreciation.
- GST and tax reporting.
- General Ledger including trial balance for prior and post periods
- Project/job costing if applicable.

We noted the ease of use of the overall interface and for each of these primary accounting functions.

the other packages but we still found the User's Guide a bit skimpy at just 144 pages. Admittedly the layout is very good with annotated screen shots and flowing and easy to read text. The table of contents is not at all detailed but the index at the back is not too bad so we guess the former is not really a problem. Even though the manual is so small it still manages to cover all the major aspects and functionality of the package well and its size simply reflects the minimal amount of hand-holding compared to other packages that pad their manuals as they assume no accounting knowledge. And, on the rare occasion we did find that some of the information we did need was not as clearly outlined as we would have liked.

In Use When creating a new customer the wizard prompts for the customers address, in the very next step the delivery address is requested but, as with most packages we have seen, the wizard does not appear to present the user with an "as above" button or option. You cannot even copy and paste from the previous window and therefore must manually enter the address a second time. Once customers are in the system simply opening the customer window will flag any problems, for example if a customer has exceeded their credit limit their entry will be in red. In use, the interface is not quite as easy to use as the other packages around its price point. For example, to edit or look at a customer's details you cannot simply double click on the customer—you must select it and then select the "record" option from the child windows button bar.

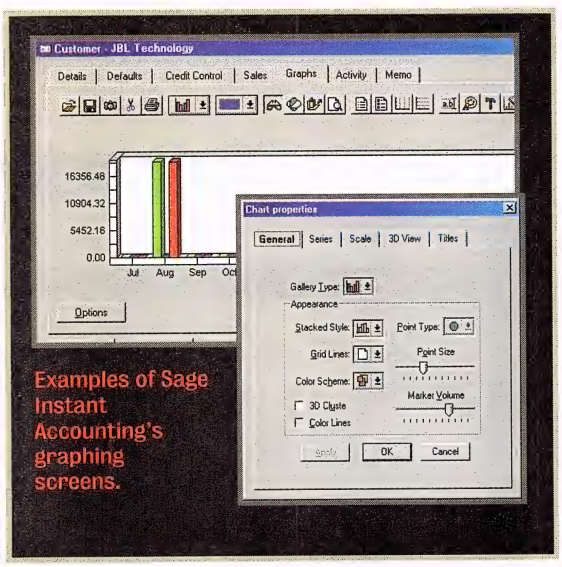
In general, the package is quite well featured, certainly more so than FirstAccounts. For example, the graphing function is very powerful given Instant Accounting's price but it is restricted in its use to the Customer, Supplier and Nominal Ledger. And, in these cases you cannot willy-nilly generate a graph of a particular set of accounts, as many of the other packages enable you to do.

Paying accounts was pretty straight forward once you found the Supplier button in Bank Accounts. This pops you into the cheque generation window. The user can manually enter a partial payment or simply click on the "Pay in Full" button to have Instant Accounting calculate the full amount.

Some options are not available from the button bar and can only be accessed from the menus. An example is the product categories for your inventory items (or Products as Instant Accounting calls them). Instant Accounting can cater for up to 999 product categories and to edit a category or add an additional one the "Settings—Product Categories" must be selected from the menu. Inventory handling is pretty basic. For example, the locations field is simply a text field, there did not appear to be a database of locations however there can be up to five selling prices for each inventory item, which is not bad at all.

Instant Accounting makes a reasonable fist of report generation. The P&L is reasonably detailed but the standard Balance sheet was a bit lean as far as detail was concerned. There's no need to despair, however, because Instant Accounting can edit existing reports as long as they are not "fixed reports", or create new reports with Report Designer and its Report Wizard. Once the relevant fields are chosen or edited the user can adjust the layout with a rudimentary but effective forms designer window.

One criticism we had is the length of time it takes to generate a report, even with the small databases we employed.



Examples of Sage Instant Accounting's graphing screens.

HIGHER-END PRODUCTS

FinancePlus V3.08-46

Distributor: FinancePlus Software, Ph: 02 9922 4866; RRP: $6100 (standard 3-user pack)

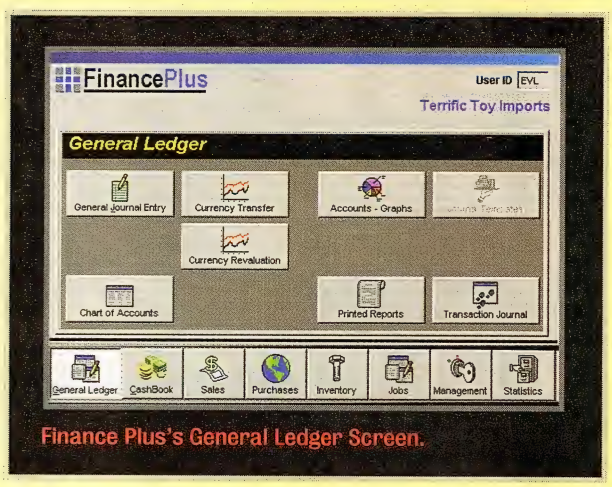
We should note that when testing began we were unaware that FinancePlus was targeted at larger companies—the first hint of its positioning was the price tag, around 30 times the price of some of the other SOHO packages. As a consequence, this package was not considered as an Editors' Choice candidate, though this is not a reflection of the package's competence, rather that it simply does not qualify for the SOHO category.

Install Our evaluation CD contained a single 21.8MB setup.exe file and, as a consequence, the CD did not autorun. The installation steps are correctly described in the manual but the "Run" window does not list the correct setup path and file-name so those impatient ones that quickly skim a manual may find themselves confused for a moment or two. Otherwise the software installation is quick and quite simple.

Setting up your company details is a simple multi-step process. The first step for example is to input information such as your company name, address, and ACN. The following few steps configure user access, file location on your PC or network, definition of financial year, and account numbering. The account numbering system cannot be changed at a later date and is restricted to between 4 and 7 digits.

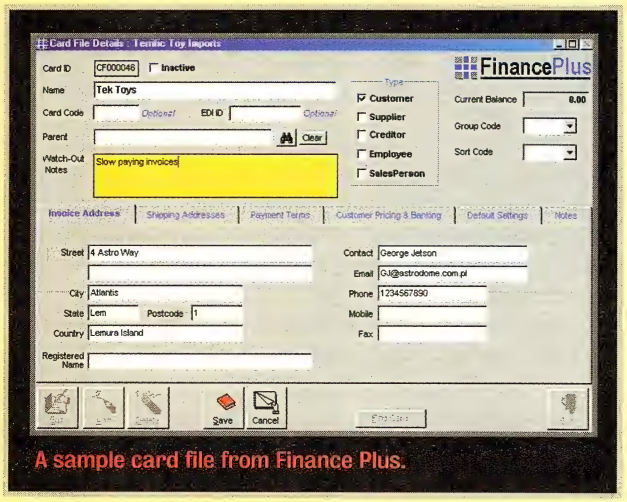
In Step 6, the user builds his or her own structure of accounts, or selects one from a list of options. We chose the latter and were presented with a pretty poor list of options: two only, Generic Accounts and Wholesaler accounts—this is nowhere near as good as MYOB or QuickBooks Pro. We chose a generic account structure for our testing.

Step 7 requires the user to confirm the account structure,



Finance Plus's General Ledger Screen.

which includes all the balance sheet account details and those of the profit and loss accounts. However, the getting started manual does not go into any detail at all on how to configure or edit the accounts, rather it simply informs the reader that the activities are described in more detail in the "System Administration Manual", which did not appear to be included



A sample card file from Finance Plus.

with the package. Admittedly it is a simple matter to rename or renumber any of the accounts but deleting a field is still a mystery. A section in the manual explaining this step in detail should be included with the package.

Step 8 is the final step, setting up your tax system. Unfortunately our package, which has a large sticker on the front proclaiming it to be GST guaranteed, claimed that the GST version was to be released March 15th. There are two option buttons for the user: the first is the old Australian Wholesale Tax System and the second, which is greyed out and inoperative, is the GST/VAT Tax System. However, there is a way around this as you can add an additional Tax to the Wholesale Tax system and name it GST to get by.

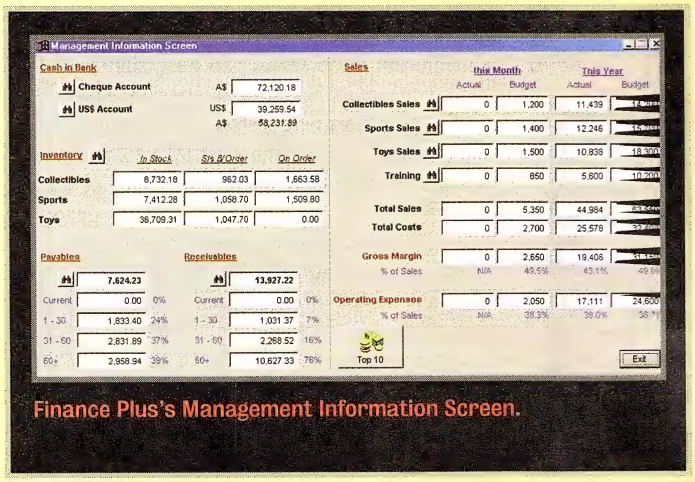
Interface A common theme with most SOHO accounting packages is the dynamic button interface and FinancePlus is no exception. The interface graphics may not be as cutesy as say MYOB or QuickBooks Pro but at the end of the day they are almost as easy to use. Only an absolute novice will find the other two programs a tad easier with their flow arrows that indicate the order in which tasks are to be carried. The master button bar is located at the bottom of the window and includes seven basic accounting functions called modules, and a statistics button to provide the user with details of, for example, the number of entries in inventory items and GL Journal entries.

Above the row of master buttons are the set of specific function buttons or "activity buttons" in FinancePlus parlance that change with the selected master button. There are a maximum of 12 activity buttons available at a time in the case of Sales and Purchases.

We found navigating the interface to be logical and fairly simple, and when accounting labels are attached to buttons they are nevertheless understandable to a novice. If you are unsure as to the exact function of one of the activity buttons simply leaving the cursor over the button will call up a tiny one-line help box. For example if you hover over "Currency Transfer", a help box tells you the function is to "Transfer currency to & from foreign currency accounts". When compared

HIGHER-END PRODUCTS

to some of the other offerings though we found eliciting extra information on an item was not as blindly obvious. For example, in many cases the user is presented with a large "binoculars" button to further expand the relevant field. In some cases the buttons were so small that the icon looked more like a pair of inkpots, but this is a minor gripe and most users would soon become familiar with the operations.



Finance Plus's Management Information Screen.

■ **Documentation** The documentation consists of two spiral-bound manuals. The smaller 31-page manual is a demonstration workbook that takes the user through a series of exercises with the supplied sample accounts. While not extensive, it does do a reasonable job of familiarising the user with the interface, logic and overall functionality.

The Getting Started manual is far more substantial and appears to cover the packages functionality very well and while the table of contents is quite detailed we found the lack of a detailed index slowed down our searches for relevant information.

■ **In Use** To help the user become familiar with the package a sample accounts file called "Terrific Toys" and an accompanying workbook are provided.

To be honest when we were testing FinancePlus we had already tested MYOB and QuickBooks Pro and, as a consequence, the FinancePlus interface initially appeared confusing. However, after using FinancePlus for only a short period of time we found our way about with ease and, in some cases (getting to say modify a customers details, for example), the package was actually easier than the other two programs.

Packages such as Quicken have quite a robust and easy-to-use alert system for recalcitrant customers whose payments are overdue for example. FP, in the short time we had to familiarise ourselves with it seemed to leave the task up to the user by say generating a report to look for the outstanding balances. We know by experience with our accounting system that unless the problems are "in your face" you can tend to let them slide a bit before you notice or go searching. To be fair, if you are processing a new customer order and the customer's current balance and any outstanding balances over 60 days, for example, are displayed on the order form. Also a quick look at the Management Information Screen will soon sniff out the shirkers.

Control of inventory items is very flexible for example stock take reports, moving stock from one warehouse to another for example are very easy to achieve. The vendor did point out, although we were unable to test their assertion, that FinancePlus's inventory handling and database size is superior to the less-expensive packages. The vendor also stated that the multiuser functionality with large databases is superior (that is, quicker response times) to the less-expensive competition; again an assertion that was outside our test parameters.

Initially we did find the package was not as robust as we would have hoped and in at least two instances we received an error alert that gave us the option of retrying the function, printing the error message or quitting FinancePlus. As it turned out one of the problems was that Windows 98 did not correctly register one of the graphics OCX files and as a consequence we could not use the graphing functions. The vendor supplied us with the fix, which was to run the command "REGSVR32 FLPGRF.OCX" to manually register the wayward file. As it turned out, the other problems we encountered all had to do with post-install tweaks. The vendor pointed out that this package is intended to be installed by one of their representatives, not the end user so most users would never experience these problems.

FinancePlus has a wide range of reports available and appears to have a more extensive set of graphical reports than MYOB or QuickBooks Pro. And, while not quite as flexible as we would like to see as far as graphical presentation is concerned FinancePlus is nevertheless superior to MYOB and QuickBooks Pro. The user can select bar or pie charts in either 2D or 3D formats, and if the latter is selected the view can be rotated. You cannot directly print the graphs but there is an option to save them as a bitmap and then from here you can load it into a paint package or Word and print it out.

GST, as previously mentioned, is not yet implemented but the underlying functionality is included in the package.

Whereas the other packages without exception were almost instantaneous, Instant Accounting often took over five seconds to complete the task. Sage did point out that the package was only a 16-bit application and the new 32-bit version, which should be a lot quicker, will be released around July of this year. The new version has already been released in the UK but Sage Australia are being commendably cautions and waiting for the UK version to have any bugs cleaned up.

Generating and managing invoices is reasonably simple process and is assisted by a Instant Accounting's powerful criteria feature which allows the user to define a whole slew of identifiers—"invoice numbers less than 102", for example. In the suppliers module, pressing the criteria button rings up a tabbed

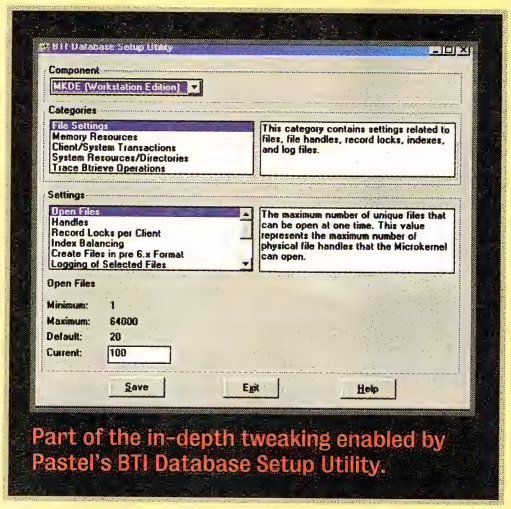
HIGHER-END PRODUCTS

Pastel Partner V5 Ultra

Distributor: Pastel Accounting, Ph: 02 9909 1588. RRP: $2595

Though not exactly aimed at our target SOHO market, Pastel's accounting package came to our Lab and we had a look at it to see how it stacked up.

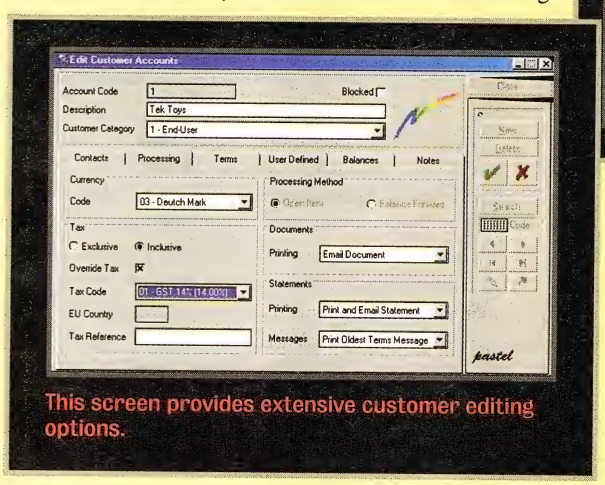
Install This package required a standard Windows installation but, unlike most other packages we have seen, Pastel recommends restarting Windows after installation. Before you even run Pastel for the first time you can go crazy tweaking with the BTI Database Setup Utility. This allows the user to tweak every imaginable aspect of the database but, to be perfectly blunt, you really need to know your stuff before playing around with this utility.



Part of the in-depth tweaking enabled by Pastel's BTI Database Setup Utility.

When setting up a new company account there are three options, copy an existing company file structure (if you have one), create your new account unassisted, or use the setup assistant.

The first couple of steps enable you to enter the typical company information, date format, and financial year definition. You can select your chart of accounts from a range of 24 options including generic accounts if you find no close match, of course the accounts you choose can be added to and modified once the setup process has completed. Again, we selected the Consulting Company option from the list but could probably just as well have chosen the "Service" accounts.



This screen provides extensive customer editing options.

The next step involves setting up the company cash or bank account. Up to 30 accounts can be in defined (as long as you have not reached the limit you can add new accounts anytime after the company accounts are setup). If you use an inventory, up to three different price scales can be assigned to the stock so you could have retail, specials, and trade prices for your hardware store. Customer default terms can be set to current, 30, 60, 90, or 120 days, or to a specific number of days.

Interface Pastel employs the button interface so common in accounting packages, however when compared to any of the other packages tested the interface has a very full-on appearance. There are far more functions and options on the screen at any one time than the other packages. This can at first appear daunting, but then you must remember that Pastel is aiming at larger companies with this package.

Unusually, the main interface has three levels of buttons compared to the other package's two levels. The first row of buttons represents the major accounting functions while the second row select four sub processes of the selected item in the first row. Depending on the selection of the first two rows the third level of up to 15 buttons changes dynamically.



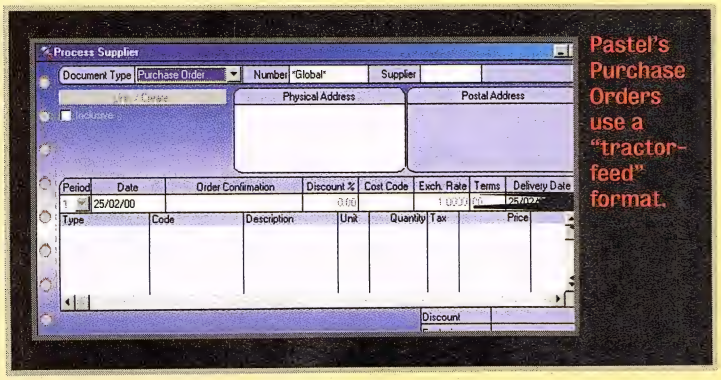
Pastel's comprehensive navigator screen and button bar.

There is also a second row of buttons located under the window menu bar the majority of which are simply convenient shortcuts to nested functions in the main button menu.

Documentation For this full-featured package the manual is only 200 pages, yet it does seem to cover most of the packages functionality reasonably well. It includes a detailed table of contents and a good index but the terms in the index are not really for the layman. To be fair, if we had not seen the MYOB manual first we would have considered the Pastel User Guide layout top notch. The content is quite easy to read and the diagrams and annotations very clear.

In Use Pastel is not a single lone package, it ships with some support utilities (although the set of three games could hardly

HIGHER-END PRODUCTS



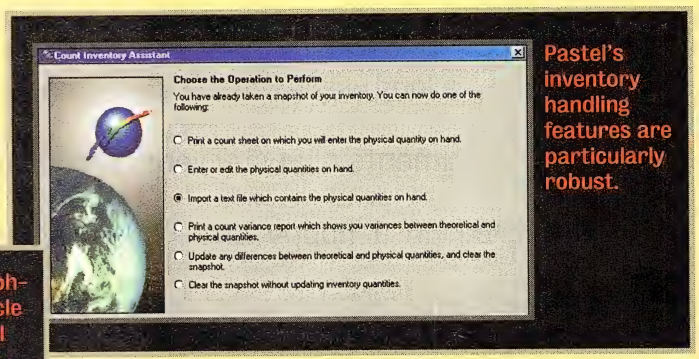
Pastel's Purchase Orders use a "tractor-feed" format.

Raising invoices, purchase orders and paying suppliers is not as easy as say MYOB but then again it is not that difficult either. Reporting is extensive but at times it can be a chore to find just what you want. The report writer is quite logical and, once you see how the formulas work, it is an easy matter to edit your own and call up the relevant formula from the Report Writer Assistant.

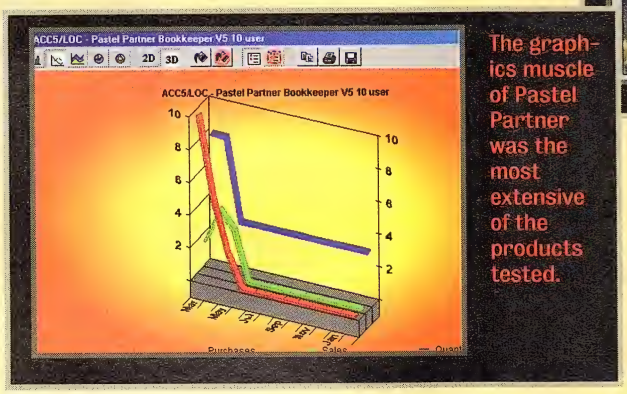
Time-saving features also includes the ability to link your quotation so that when the quote is accepted and the invoice needs to be raised it will drag in the relevant quote information. Graphic muscle is the most extensive of the packages tested. When the graph button on the top menu toolbar is selected it launches a child application that includes a range of graph types, five in all, which can be rendered in 2D or 3D and with a tasteful gradient fill background like our example if desired.

be called "supportive). The Forms Designer, however, is a very useful addition that does provide quite a powerful standalone tool for designing and building your own custom forms.

While running Pastel you cannot help but be impressed with the seemingly enormous range of functions and the detail for which it strives. It is arguably the most detailed of the packages tested, even FinancePlus did not appear to have such a wide range of time-saving functions. Having said this there are a few obvious omissions such as time/billing management for projects, for example.



Pastel's inventory handling features are particularly robust.



The graphics muscle of Pastel Partner was the most extensive of the products tested.

Inventory handling is particularly robust with an extensive range of reports and functions—you can input a bill of materials to manufacture an item or conversely "unmanufacture" a product to its component list. Carrying out a stock take is streamlined by the ability to gather the data in numerous ways by simply printing stock sheets to wander around and manually correlate, or having already gather data by electronic means simply import a text file.

Creating and editing customers is easy in practice but can be time consuming if you intend to use all of the features provided. There are six sub windows accessed by a row of tabs and not only can you input the clients address, tax, terms, relevant price list and credit you can also store the clients birthday, spouses name and other useful details. Additionally, invoices and statements can be printed or e-mailed automatically to the client by setting the preferences at this point.

■ **Conclusion** Pastel is certainly a very capable product but accounting novices should definitely steer clear and while many tasks are rendered easy, the menu structure and sheer volume of detail could prove daunting and unnecessary to a smaller organisation. This is certainly worth a look for a good-size operation requiring a solid accounting package.

window with no less than 24 fields that the user can define.

Sadly the package does not include purchase orders, you can record invoice and credit details from suppliers but the lack of a facility to raise a purchase can be a problem with a small business as you must manually generate and track purchase order numbers. Instant Accounting also does not include any project estimation or job costing features and management of project timesheets is also not included.

Proper accounting practices are strongly adhered to by Instant Accounting for example any amendments or reversals to your accounts leaves a true audit trail that reports the original amounts and then the amended amounts.

■ **Conclusion** As far as features are concerned, Instant Accounting is a reasonably accomplished package. The lack of purchase requests is a shortcoming that can be addressed by purchasing the next level up in Sage's extensive accounting software range. However, its ease of use lags behind the other packages we reviewed and if you are a novice in this field then we would suggest you look elsewhere. PC

Stretch Your Storage

Adding a storage system to your network can save you space, time, and money.

BY LES FREED

The files we work with on our PCs have come a long way from the word processing documents of yesteryear, which could easily be stored on a floppy disk. Video, graphics, and archived data all take up valuable real estate on our cramped hard disks and servers. So if you want to expand the storage capacity of your business quickly—and ultimately reduce network traffic—consider adding a network-attached storage (NAS) server to your LAN.

These servers offer a rare computing combination: they're both affordable and easy to use, supplying an attractive and price-efficient alternative to buying new file servers or upgrading the hard disks in your existing server. We tested systems ranging in price from about $50 per gigabyte of storage on the low, nonexpandable end to upwards

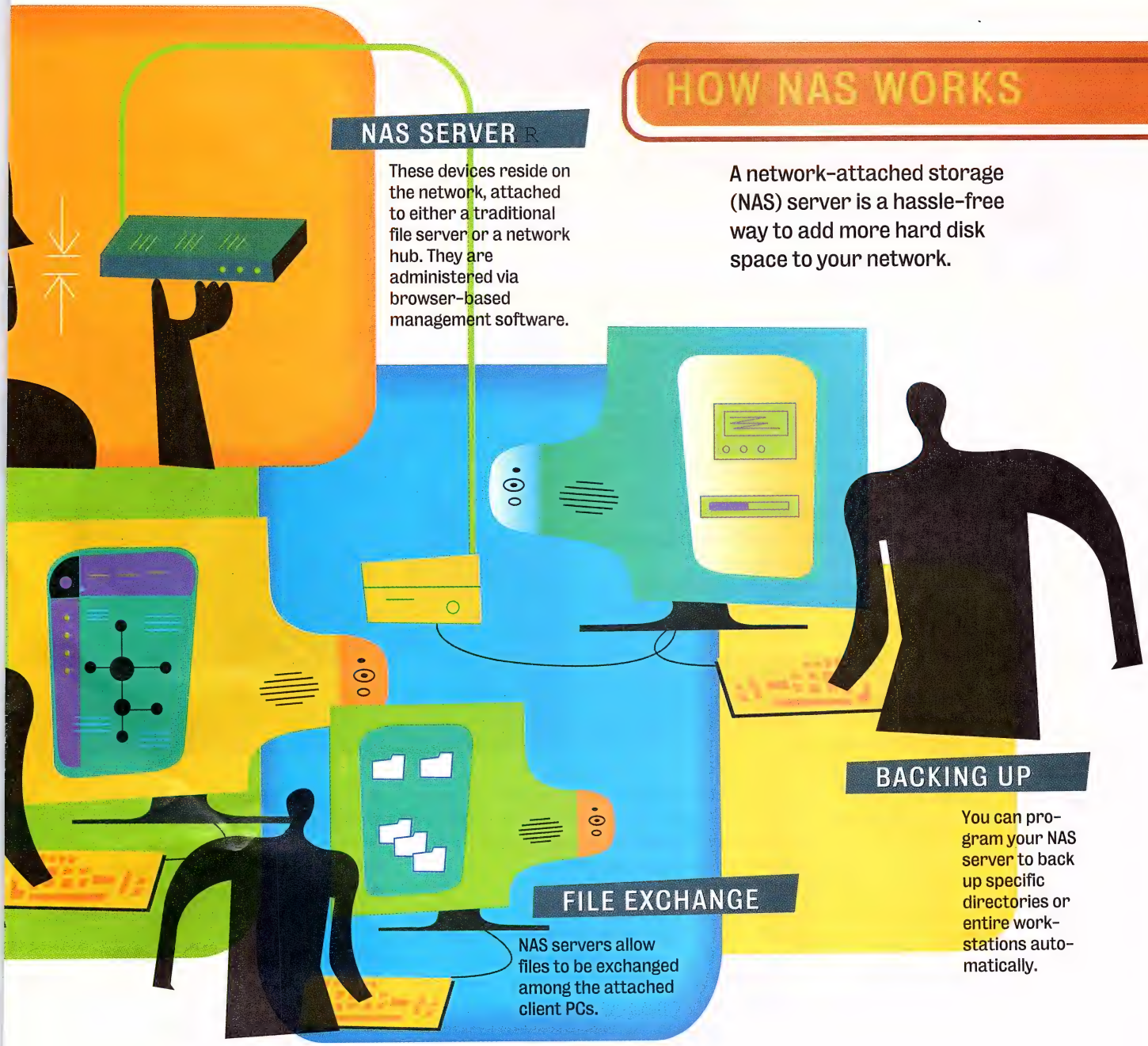


MAINTENANCE

A network administrator can monitor and maintain the NAS server with the embedded browser-based management software.

IN THIS REVIEW

136 HP SureStore HD Server 4000
137 Intel InBusiness Storage Station
137 Maxtor MaxAttach
138 Linksys Instant GigaDrive
140 NetGear Network Disk Drive ND520
140 NSS mStor 1U
142 Procom NetForce 100
144 Quantum Snap Server
143 Summary of Features
144 Performance Tests



of $1300 per gigabyte for systems with many of the same redundancy, reliability, and expandability features that midrange file servers provide.

So there really is a NAS solution for just about any budget. Best of all, you can install one of these devices in less than 30 minutes and manage it from anywhere via a Web browser.

WHO NEEDS ONE?

NAS servers are extremely flexible: you can use them as primary or secondary storage on your LAN, as shared backup devices for your small office or workgroup, or even as personal backup devices for individual clients. They operate somewhat slower than dedicated file servers, but they're much faster than tape drives.

Many small offices need to share files among several people. A NAS server lets them do so quickly and easily, without incurring the installation and administrative costs associated with deploying a dedicated Windows NT or NetWare server. Although most NAS servers don't provide the same level of performance as dedicated file servers (see our benchmark test pages), they are more than fast enough for most small-office and departmental needs.

If you're faced with overflowing hard disks on your main file server, a NAS can provide some breathing room—without forcing you to take the main server down for maintenance. By moving archived or finished projects off the main server and onto the NAS server, you'll free up main disk space and reduce network traffic. Several of the products in our roundup support Macintosh, Linux, and Unix clients—in addition to Windows PCs—so cross-platform offices have a solution as well.

NAS servers also make excellent backup devices for individual clients on your network. Again, they're faster and more convenient to use than tape backup, and they provide instant access to files. The Intel InBusiness Storage Station includes Centered Systems' backup utility Second Copy 97, so users can automatically back up selected files from their hard disks to the NAS server. The LinkSys and NetGear products we reviewed provide Ethernet uplink switches, which let users attach their notebooks or desktop PCs directly to a NAS server without hubs or special cables, making it easy to drag and drop critical files from a PC to the server.

PC MAGAZINE AUSTRALIA EDITORS' CHOICE

Editors' Choice

Small workgroups: Quantum Snap Server
Large workgroups: NSS mStor 1U

The nine NAS servers we tested all offer a good combination of features and performance. Two units distanced themselves from the pack, however. The Quantum Snap Server and the NSS mStor 1U are our Editors' Choices for small and large workgroups, respectively.

The Quantum Snap Server has 40GB of capacity on two 20GB drives. For added security, the second drive can be configured with RAID 1 mirroring. As its name suggests, setup and administration are extremely simple. In addition, the device supports Mac, Microsoft Windows, NetWare, and Unix clients.

Larger workgroups and businesses usually count on fast performance to deal with large amounts of data. Fast read time and throughput are just what you get with the NSS mStor 1U, from Network Storage Solutions. The mStor performed on a par with an HP file server on our tests and easily bested the rest of the field. It is easy to install and configure, and its management software is among the best we saw.



NAS servers operate much like standard file servers, but they don't require dedicated server PC or server OS licenses. Most use Pentium or StrongARM processors running proprietary server software. From the client's point of view, the NAS server looks and works exactly like a file server, so no retraining or special software is needed. Users can browse servers and map drives on the network, just as they would with a Windows NT or NetWare server.

IN THIS ROUNDUP

For this roundup, we asked for turnkey NAS servers with 100Mbps Ethernet connections targeting the workgroup/small-office marketplace. Eight vendors—Hewlett-Packard, Intel, Linksys, Maxtor, NetGear, Network Storage Solutions, Procom, and Quantum,—submitted.

The eight products in our roundup cover a lot of ground, ranging from just $1278 to $12,000, and from 29GB to 72GB of storage. Some—such as the Intel, Linksys, Maxtor, and NetGear products—are small boxes, not much bigger than Ethernet hubs. These lower-end products don't have room for expansion, but they provide exceptional value and surprisingly good performance. At the other end of the scale, the HP and Procom products offer high-reliability features like redundant power supplies and hot-swappable spare drives. Both the HP and Procom units provide easy storage expansion via cartridge-loading disk drives.

WHICH ONE?

Unless you need the high reliability and drive expansion features of the higher-end systems, you'll get a lot more storage for your money with one of the smaller, non-expandable servers. The 20GB Linksys Instant GigaDrive—the least expensive product in the group—costs $66 per gigabyte, while the high-end system from NSS ($12,000, 9GB) weighed in at $1333 per gigabyte, respectively.

For a mixed-platform shop, choices are more limited. Only three of the products we reviewed (from Linksys, NSS, and Quantum) support non-Windows clients. The Quantum Snap Server was the only product to support Mac, Microsoft Windows, NetWare, and Unix clients.

WHAT'S NEXT?

As PC prices fall, we expect to see NAS prices follow suit. Many of the components in NAS servers (CPUs, RAM, and especially hard disks) are off-the-shelf PC components, so the same forces that are driving PC prices down should affect the NAS market as well. With International Data Corp. (IDC) predicting a huge 54 percent growth per year in the NAS market through 2003, it's a safe bet that we'll soon see devices with pricing and configurations to fit almost every office's needs.

HP SureStore HD Server 4000

27GB, Price TBA. Hewlett-Packard Australia, Ph: 13 13 47; www.hp.com.au ●●●

HP is a major force in the RAID subsystem and tape storage markets, and the HP SureStore HD Server 4000 (with three 9GB disks) marries the two technologies into one attractive, easy-to-manage NAS. The SureStore combines up to six disks—up to 18GB each—with a 40GB DAT backup system in a single mini-tower chassis.

The SureStore had the second-best scores on our NetBench tests. The cost (though not available at press time), as well as the additional features and expandability, will make it most appropriate for relatively large businesses. The SureStore is a strong contender, lacking only some of the reporting features and sacrificing only some of the performance of our Editors' Choice, the NSS mStor 1U.

Part of the extra cost is due to the Sure-

PHOTOGRAPHY BY THOM O'CONNOR

Store's excellent data and power redundancy features. The unit's cabinet includes redundant, hot-swappable power supplies and houses six SCSI drive array slots. A slot above the drive array provides space for a field-installable 24GB or 40GB DAT drive (which came already installed on the model we tested), and a rear-panel SCSI serial connector lets you connect one or more external DAT drives. The SureStore also provides UPS monitoring via a serial port; attach your UPS to the NAS and you'll be able to view its status and other diagnostic information.

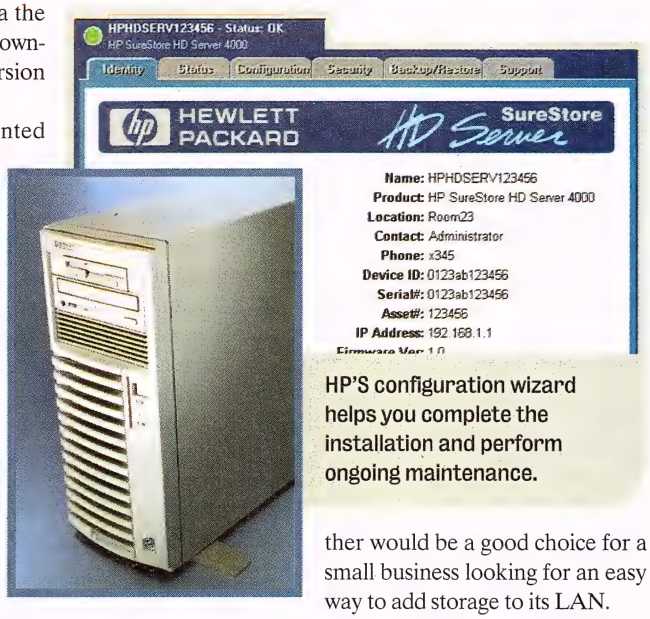
Our test unit was equipped with three 9GB Ultra Fast/Wide SCSI disks. The disks operate in RAID 5 mode, so the 27GB of raw disk space yields about 18GB of usable storage. You can add a fourth disk as a hot spare, or you can fill out the array with additional 9GB or 18GB disks. If you need even more storage, you can order the SureStore with six 18GB disks.

Installation is simple, thanks to a front-panel LCD and intuitively designed buttons. When you start the SureStore for the first time, it attempts to obtain an IP address via a DHCP server. If none is found, the unit prompts you to enter an IP address using the front-panel buttons. Once this address is set, HP's excellent browser-based configuration wizard helps you complete the installation and perform ongoing maintenance via the browser.

The SureStore has some of the most thorough security and user management features of any product we tested—right up there with those of NSS and Procom. The management interface is password-protected to prevent unauthorised access, and the drive bays and system cabinet include key locks to prevent drive theft or tampering. The SureStore's built-in user database lets the system administrator control access on a user or shared basis, and user authentication requests can be referred to a Windows NT domain server if one is available.

Like most HP network products, the SureStore can be remotely managed and monitored using HP's management suites OpenView and TopTools. The SureStore maintains a browser-accessible event log, but it doesn't keep track of disk usage or network traffic. Its processor is a 300MHz RISC chip with 128MB of RAM, and the system's operating software resides in 32MB of flash ROM. You can update the firmware via the browser interface by downloading the latest version from HP's Web site.

We were disappointed by the SureStore's lack of Macintosh and Unix client support. But take heart: Hewlett-Packard recently added Mac support to its SureStore network tape drives and is planning to introduce Mac support into the SureStore in a future update.



HP'S configuration wizard helps you complete the installation and perform ongoing maintenance.

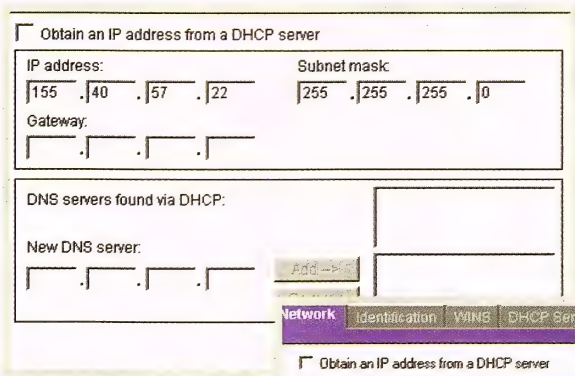
Intel InBusiness Storage Station, Maxtor MaxAttach

InBusiness: 24GB, $2068. Synnex, Ph: 03 9540 0555; www.synnex.com.au ●●● MaxAttach: 80GB, $3700. Maxtor Australia, Ph: 02 9369 3662; www.maxtor.com.au ●●●

Twins, separated at birth? Almost. The Intel InBusiness Storage Station and the Maxtor MaxAttach share a common hardware platform and have similar GUIs, but they have vastly different disk capacities and are sold through different channels. Both products provide excellent performance and value; either would be a good choice for a small business looking for an easy way to add storage to its LAN.

Intel offers the InBusiness in 12GB and 24GB versions, while the MaxAttach was introduced in the US in 18GB, 36GB, and 72GB models. The major difference between the Intel and Maxtor products lies in the hard disks: Intel's 24GB model has two 12GB Western Digital EIDE disks; the most capacious MaxAttach started with two 36GB Maxtor hard disks.

We tested the 24GB InBusiness and the 36GB MaxAttach. The Intel and Maxtor products turned in very similar performance results, with the Maxtor having a slight edge on all our test runs. Both finished in the mid-



INTEL'S management software interface offers fewer menu choices and is slightly simpler to operate than Maxtor's, but both provide nearly identical functionality.

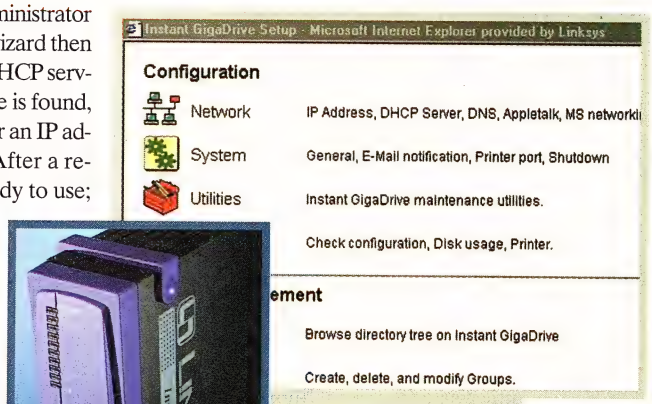


dle of the pack, holding their own against systems that cost nearly twice as much.

By the time you read this, though, Maxtor will have made a change in its product line offering. Instead of the 18GB, 36GB, and 72GB models, the MaxAttach will be available in configurations of 20GB, 40GB, and 80GB. The newer models will be using higher-density disks, up from 9.1GB to 10.2GB per platter. And the 40GB version (replacing the 36GB model) will consist of two 20GB disks, which means it will have the same mirroring capabilities as its larger sibling.

Apart from the disks, both products share an identical 266MHz Pentium MMX–based hardware platform with 32MB of RAM and very similar cosmetics. The front panel has four status LEDs, showing power, LAN, and disk activity, but there are no disk utilisation LEDs as on similar products from Linksys and NetGear. The rear panel hosts a 10/100 Ethernet connection, but neither product provides an MDI switch to allow direct connection to a client PC. Both use an external power supply and have a rear-panel on/off switch.

Installation is similar for the two. A companion CD-ROM contains a simple setup wizard that prompts you to set your unit's clock and select an administrator password. The setup wizard then attempts to locate a DHCP server on the LAN; if none is found, it prompts you to enter an IP address for the server. After a reboot, the server is ready to use; further administration is done through an attractive, well-organised browser interface. The Intel version of the interface offers fewer menu choices and is slightly simpler to operate than that of the MaxAttach, but both provide nearly identical functionality.





THE GIGADRIVE includes Macintosh support and a built-in print server—a combination not found in any of the other products we tested.

Both the Intel and Maxtor products can authenticate users via a Windows NT domain server, making them good choices for organisations that use domain security. If you don't have a Windows NT server on the LAN, you can use the browser interface to enter user names and passwords.

Once you've configured the server, you can make a backup copy of the configuration file (including user names and passwords) onto the server's hard disk.

A built-in scheduler lets you automatically back up the configuration data as often as you like.

Maxtor's product is designed for the corporate and VAR markets, where it's assumed that an experienced technician will install the product. Intel's version of the product is focused on the small-office marketplace, so the company includes some programs that make the NAS unit easier to use, like an automatic client drive-mapping utility. Intel also bundles backup software called Second Copy 97 with its server; this software automatically copies a PC's entire hard disk onto the server with little or no user intervention.

Linksys Instant GigaDrive

20GB, $1278. Linksys Australia; Ph: 03 9563 9549; www.linksys.com.au ●●●

Priced at only $1278, the Linksys Instant GigaDrive is the least expensive product in our roundup. But the diminutive price is deceptive, because the GigaDrive includes Macintosh support—as does the Quantum Snap Server—and a built-in print server, a combination of features not found in any of the other products we tested. You might expect such a low-cost device to finish at the bottom of the pack with regard to performance, but the GigaDrive held its own with products that cost twice as much.

Linksys—like NetGear—caters to the small-office and home networking markets. Most small businesses don't have dedicated IT persons on staff, so ease of installation and ease of use are number-one priorities. Like the NetGear Network Disk Drive ND520, the GigaDrive is exceptionally easy to install and configure. But the GigaDrive offers security and disk quota management features that the NetGear unit doesn't supply, making it a better choice for small offices and departments where security is a concern.

The GigaDrive is housed in an attractive purple plastic cabinet that can stand on its



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side or horizontally. The front panel displays a full set of status lights, including a set of disk usage LEDs that show at a glance how full the disk is. The rear panel hosts an RJ-45 Ethernet connector with an MDI switch, letting you connect the GigaDrive to a hub or a PC. A parallel-port connector makes a surprise appearance. And the GigaDrive's built-in print server lets you share any parallel printer on the LAN.

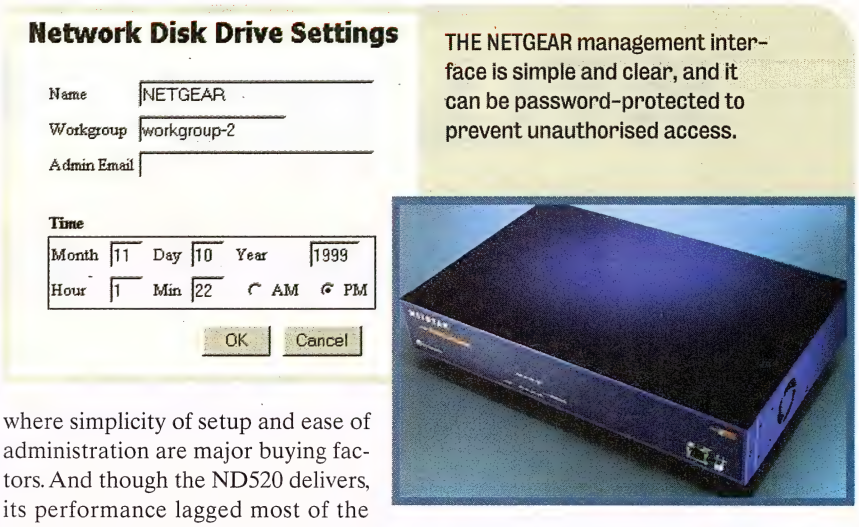
Linksys acknowledges the upward trend in the Mac market by including excellent Macintosh support in the GigaDrive. Macs and PCs on the same LAN cannot exchange files directly with one another, but they can access files stored on a server. The GigaDrive provides AppleTalk support so that Mac clients can access files stored on shared disks. This is especially appealing for offices that use Macs for graphic design and page layout, since it provides a convenient way to move files between Macs and PCs without resorting to removable media like Iomega Zip or Jaz drives.

Because it is affordable, performs admirably, and offers a host of features, small offices—especially those with a mix of Macs and PCs—would be well served by the Linksys Instant GigaDrive.

NetGear Network Disk Drive ND520

20GB, $1999. Netgear; Ph: 02 9927 8918; www.netgearinc.com ●●●

The NetGear Network Disk Drive ND520—like the rest of NetGear's product line—targets the small-business market, where simplicity of setup and ease of administration are major buying factors. And though the ND520 delivers, its performance lagged most of the other products on our tests, including competitively priced units from Intel and Linksys. The good news is that its benchmark test scores may not matter. NetGear markets the ND520 primarily as a backup device for laptops and file servers, and its throughput speed is more than adequate.



THE NETGEAR management interface is simple and clear, and it can be password-protected to prevent unauthorised access.

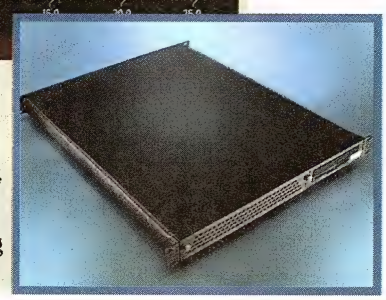
The $1999 ND520 (20GB)—like its smaller sibling, the $1199 ND508 (8GB)—provides storage in a small, unobtrusive box that you can quickly install anywhere on your LAN. Unlike most of the smaller servers in our tested group, the 20GB ND520 has a built-in power supply instead of a bulky external transformer.

The ND520's front panel contains a single RJ-45 Ethernet connector with speed, activity, and link LEDs, and an uplink switch for attaching either a PC or a network hub. Another row of LEDs shows disk utilisation at a glance, and a rear-panel on/off switch performs an orderly shutdown of the system (rather than just cutting off the power).

NetGear provides a simple foldout installation poster; you can find a more complete manual on the CD-ROM, but you're not likely to need either one. Installation is a simple matter of plugging in the power cord and a network cable. If your network is equipped with a DHCP server, you're finished. If your network does not have a DHCP server, you'll need to install and run a utility program on the provided CD-ROM to set the ND520's IP address.



THE mSTOR interface provides status reporting, including charts and graphs of network and disk usage and system log information.



When you're done, you can use a browser to manage the user access list. By default, all users have access to the entire shared disk, but you can limit access on a directory basis. The management interface is simple and clear, and it can be password-protected to prevent unauthorized access or changes.

In addition to the manual and the IP configuration program, NetGear's CD-ROM contains a handy tool that locates all the NetGear servers on a LAN and automatically maps a drive letter to each one. This is a much appreciated addition that lets everyone in your office access the ND520 with just a double click.

If speed is not your small office's primary concern, NetGear offers a reliable, easy-to-use storage solution, though the Linksys unit offers better performance at a cheaper price.

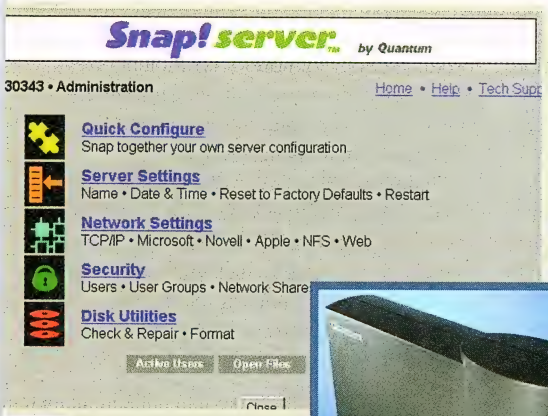
NSS mStor 1U

9GB, approx. $12,000. XSI Technology; Ph: 02 9460 7411; www.xsi.com.au ●●●●

PC MAGAZINE AUSTRALIA EDITORS' CHOICE

The $12,000 NSS mStor (pronounced "microstore") 1U combines off-the-shelf hardware, a clever custom cabinet, and proprietary software for a flexible, high-performance NAS product. The mStor is easy to set up and configure, and its performance was impressive—on a par with that of the Windows NT server we tested for comparison. It easily bested the field on our benchmark tests; coupled with its management and security features, that makes the mStor an obvious Editors' Choice.

NSS specialises in NAS devices for the booming ISP marketplace, where the company's products are used to provide Web and





THE SNAP SERVER can be configured and managed from any Web browser, using the excellent browser interface.

FTP storage space for ISP hosting clients. Although it is the most expensive product in our review group, the mStor is the smallest server in the company's product line. The 1U in its name refers to the fact that it occupies only one rack unit (1.8 inches) of vertical space when it is installed in a standard 19in equipment rack.

The mStor is essentially a dedicated high-performance PC running NSS's proprietary multitasking server OS. It consists of an Intel 440GX motherboard, a 500MHz Pentium III CPU, and 256MB of RAM, packed into a large (48 x 58cm) pizza-box enclosure. The unit includes an Intel 10/100 Ethernet adaptor and an Adaptec 7896 Ultra-2 SCSI controller and is available with capacities of 9GB to 36GB. We tested the 9GB model.

The mStor's rear panel provides connectors for an external SCSI device, an Ethernet adaptor, and an optional keyboard and monitor. The front panel hosts a 3.5in floppy disk drive, a CD-ROM drive, and slots for two hot-swappable SCSI hard disks. The external SCSI interface can connect to virtually any external SCSI storage device, including tape drives and RAID arrays.

Installation is simple, especially if you connect a keyboard and monitor for the initial setup. A simple configuration menu walks you through the process of setting the unit's IP address and workgroup name; once you've completed these basic steps, you can access the mStor's Web interface from any browser. If you don't want to connect a monitor and keyboard, you can use any text editor to edit a file on the mStor's boot disk and then start the system from a floppy disk.

The browser interface uses a treelike menu system on the left side of the screen, making it easy to locate any item on the menu. This interface provides the best real-time status reporting of any of the products we tested, including real-time charts and graphs of network and disk usage, device status, and system log information. If you leave a monitor attached to the mStor, you can view text-based real-time disk and network traffic status, along with colour-coded alert and alarm messages. The monitor and keyboard provide a second, text-based administration and configuration console for the system, using the mStor's built-in menu system.

The mStor was originally designed as an NFS file server for the Unix marketplace, and NSS recently added SMB support to let the mStor operate in a Windows environment. Though it can authenticate users on a Windows NT domain server, the mStor maintains its own list of file and directory rights. This arrangement allows security-conscious users to work with the mStor's own user-rights database rather than relying on an external Windows NT server for authentication. Unfortunately, doing so currently requires you to maintain a separate user database on the mStor. NSS plans to improve Windows NT security integration in a future release.

Procom NetForce 100

36GB, $10,221. SCSI Integration; Ph: 03 9281 3889; www.scsiint.com.au ●●●●

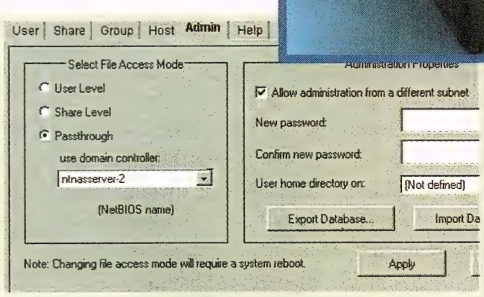
Every now and then we run across a product that we really, really want to like. The Procom NetForce 100 is one of those. It's attractive, built like a tank, and very easy to install, use, and administer. Unfortunately, the NetForce's relatively high price dampened our enthusiasm.

The NetForce, an industrial-strength NAS, has many of the same high-end features found in the higher-end units from HP and Network Storage Solutions, like hot-swappable RAID 5 disks, redundant power supplies, and hot-swappable fans. But you'll pay big bucks for these features. The NetForce costs about $283 per gigabyte—more than five times the cost of the Maxtor MaxAttach 72, a product that easily outperformed the NetForce on our tests. But to be fair, the NetForce's RAID array provides the best data redundancy and reliability features in the roundup.

Housed in an attractive, beautifully finished black mini-tower chassis, the NetForce has an illuminated LCD panel, a set of status lights, and a set of buttons on the front panel. Six lockable drive bays provide up to 36GB of storage using RAID 5. We tested the NetForce with its maximum 36GB capacity. The rear panel contains two redundant hot-swappable power supplies and four hot-swappable fans, as well as 10/100 Ethernet and external SCSI connectors.

Like many of the products we reviewed, the NetForce can obtain an IP address via DHCP if that's available, or you can enter the IP address manually using the LCD and buttons. Once you've entered the address, the NetForce is ready for use, or you can perform additional configuration via the browser interface. We had our NetForce up and running in less than 10 minutes, including the time it took to set the IP address and reboot the system. The attractive browser interface includes a quick-start setup wizard that walks you through the unit's first-time installation.





THE NETFORCE has some of the best e-mail and pager notification alerts of any product in this roundup.

Ongoing maintenance and administration tasks are also performed through the browser interface, with one glaring exception: You can manage the RAID array only through a clunky text-mode telnet interface.

On the plus side, the NetForce has built-in support for managing a tape drive (if you attach one to the SCSI port), including scheduled, unattended backups, which means you can archive your disk array on tape. The NetForce also has some of the best e-mail and pager notification alerts of any of the products we tested, on a par with those of the Intel and NSS units, and it has hot-swappable drives and the RAID protection.

Quantum Snap Server

40GB, $3499. LAN1; Ph: 02 9319 6411; www.lan1.com.au ●●●●●

PC MAGAZINE AUSTRALIA EDITORS' CHOICE

The 40GB Quantum Snap Server provides abundant storage for its price, RAID data protection, and excellent cross-platform support in a compact, easy-to-manage package. The Snap Server also outperformed the other small workgroup products in our roundup. Its combination of price, performance, and management features makes the Snap Server the Editors' Choice for small workgroups.

Quantum offers two models of the Snap Server. The 20GB model lists for $1950. We tested the larger 40GB version; it contains two 20GB hard disks, which you can configure to operate as one large drive (using RAID 0), two separate 20GB drives, or a single 20GB drive with RAID 1 mirroring for extra reliability.

BENCHMARK TESTS

Network-Attached Storage

PC LABS

There is much more to a network-attached storage system than just performance. But if high performance in both throughput and response time is a requirement, the NSS mStor 1U is the only choice in our roundup to offer speed comparable to that of a typical workgroup file server like the HP NetServer E 60.

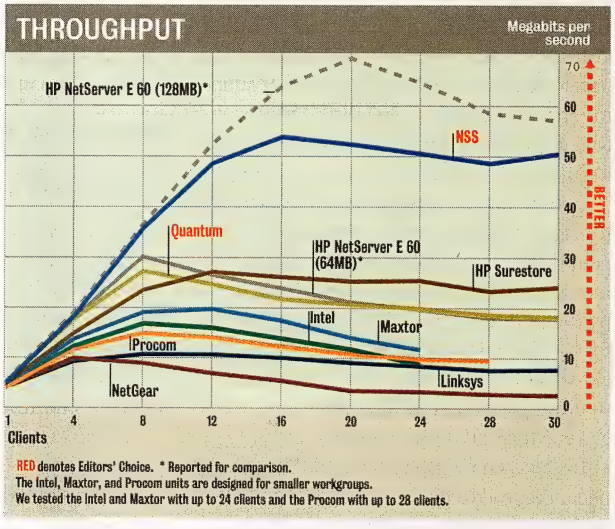
Network-attached storage (NAS) systems are designed primarily to provide the functionality of file servers. As performance needs may vary, depending on your network environment and size, the data we report here must be viewed in the proper context. To ascertain each NAS system's ability to deliver the performance level required for its role, we tested each system with ZD NetBench 6.0. This test program measures the server's ability to handle file input and output (I/O).

NetBench 6.0 is highly network-bound and exercises the hard disk subsystem heavily. The hard disk subsystem's performance depends on the amount of main system memory used for drive caching. As none of the NAS systems in the roundup are designed to support large numbers of users, we varied the number of clients on our test network from 1 to 30 only.

NetBench produces data that can be constructed into scalability curves. Each data point on the first chart represents the total throughput (in megabits per second) that the server achieved with a specific number of clients attached. The later the curve peaks, the more clients the NAS system can support effectively. Initially, the throughput increases with the number of clients until the server's limited I/O bandwidth is completely inundated with requests. Beyond this point, adding more clients only increases the system overhead, so total throughput decreases. We also plotted a scalability curve that shows the average response time. This graph illustrates the user experience at each client load level. We report the results that an HP NetServer E 60 achieved with 64MB and with 128MB of RAM for comparison.

The fastest NAS is not always the best choice for your network. Because NetBench 6.0 is a stress test program, the number of clients on our test network does not directly represent the size of a network in a real work environment. In real life, not everyone on the network is accessing the server constantly at the same time. Our 4-client-load level, where 4 client systems are constantly interacting with the NAS, roughly simulates a moderately active 20-client network or a lightly active 40-client network. If you are looking for a NAS to support a small workgroup's file-serving needs, any NAS we reviewed may be fast enough. Case in point: with four clients attached to the network, the difference in response time between the slowest NAS (the NetGear) and the fastest (the NSS) was only 3 milliseconds. But if your workgroup consists of users who actively upload and download large files, like graphics designers, then a NAS with a higher throughput is desirable.

You also have to consider the projected growth of your workgroup. You'll want a NAS with throughput performance



Scalability curves: Each data point on the first chart represents the total throughput (in megabits per second) that the server achieved with a specific number of clients attached. With up to four clients active, the Quantum Snap Server was almost as good as the NSS mStor 1U in terms of total throughput. For a small network, this means the product is nearly equivalent to the NSS unit. Watch where the curves peak, however; the NSS clearly distinguishes itself with a larger client load. The later peak of the unit indicates that it has the potential to support a large-scale network, such as an ISP or Web-hosting service.

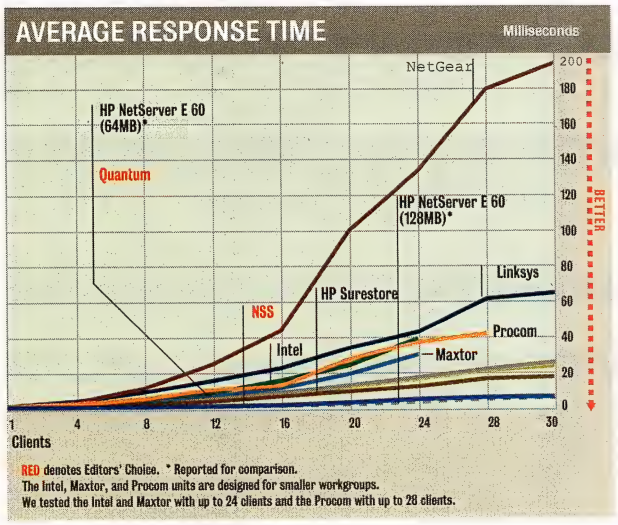
The Snap Server is housed in an attractive plastic cabinet with four status LEDs on the front panel; the power and Ethernet connectors are on the back. A recessed rear-panel button lets you selectively reset the unit's IP address, administrator password, or network settings, a feature we found convenient when we moved the Snap Server from one test network to another. Installation is simple, using either the Macintosh or Windows version of the configuration program SnapAssist (both versions are provided on a CD-ROM). Once you've performed the initial configuration with SnapAssist, you can configure and manage the Snap Server from any Web browser, using the unit's excellent browser interface.

We found the Snap Server's cross-platform connectivity to be the best among all the products we tested. The Snap Sever supports Windows, Unix, and Macintosh clients, using the TCP/IP, IPX, NetBEUI, and AppleTalk protocols. The unit can authenticate users internally via a NetWare Bindery server or a Windows NT domain controller.

The Snap Server's browser interface is excellent, and an extensive help system provides detailed help for every screen—a feature lacking in most of the products we tested. The Web browser also provides access to the unit's colour-coded event log. Critical errors display in red and warnings in yellow, so you can see important error conditions at a glance. E-mail notification of system failures or problems is provided for up to two users. Workgroups and small businesses—especially cross-platform environments—won't find a better storage solution than the Quantum Snap Server. PC

that peaks at a higher client load if you expect your workgroup to grow. If the workgroup grows no larger than 40 to 80 people, users will experience little difference between the Quantum Snap Server and the NSS mStor 1U. But if your workgroup doubles, the mStor may respond four times as fast as and yield more than twice the throughput of the Snap Server. An ISP that has to add more storage to its Web server needs a NAS that can maintain a low response time and high throughput with many clients on the network.

True to the vendor's claim, the NSS mStor 1U demonstrated its ability to act as added storage for a demanding environment, like an ISP's Web server cluster, by producing high throughput and fast response time at high-client-load levels. The mStor was the only NAS comparable in performance to the HP NetServer E 60, a Windows NT file server. The HP SureStore HD Server 4000, Quantum Snap Server, and SciNet Blazer had almost identical performance, nearly as suitable for serving a small to midsize workgroup (up to 80 users) as the mStor. Though high-priced, the Procom NetForce 100 turned in disappointing performance, even lower than that of the lower-priced Intel InBusiness Storage Station and the Maxtor MaxAttach. The Intel and Maxtor entries have almost identical hardware, and their performance would be adequate for a small workgroup; however, they were clearly outperformed by the Quantum Snap Server, which targets the same market. The Linksys Instant GigaDrive and the NetGear Network Disk Drive ND520 are aimed at users who want an instant storage solution for a very small network (fewer than 10 clients), and their benchmark test results confirmed the target market. **—Analysis written by S. Jae Yang. Special thanks to Aaron Martinez of ZD Labs.**



Timing isn't everything: This graph illustrates the user experience at each client load level. In the average small-business office, documents that reside on the network are primarily small files. When there were only a handful of clients accessing the server, all the entries turned out fast response times. As the client load level increased, devices such as the HP SureStore HD Server 4000 and the NSS mStor 1U stood out for consistent fast responses. But if you have to deal with very large files, like graphics or digital videos, throughput becomes a much more important factor to consider—even with just a few clients loaded.

HOW WE TESTED

Each NAS system was attached to a network consisting of 16 Pentium/200-based Dell Dimension XPS 200N clients, eight Pentium/166-based Dell Dimension XPS P166 clients, and six Pentium II/266-based Dell OptiPlex GXA clients. All 30 clients were running Windows NT Workstation 4.0 (with Service Pack 4) and had Intel PRO/100+ Fast Ethernet adaptors. The 31-node network (with 30 clients and one NAS) was physically connected through an Extreme Networks Summit 48 Fast Ethernet switch. The NAS system was attached to the network via TCP/IP, or via SMB if it did not support TCP/IP.

On each NAS system, we ran the Standard Mix from ZD NetBench 6.0, modified to run on a 30-client network. NetBench 6.0 evaluates a server's ability to handle file I/O requests from clients. Although NetBench is a synthetic test program, it profiles the workload on the server caused by actual applications running on the clients. We used the Standard Mix test suite, which runs with 1 client, then 4, and increases the load in multiples of 4 thereafter; we modified the suite to stop at 30 clients. The active clients engage the server with requests for network file operations. During the test runs, each client records the amount of data exchanged with the server as well as the elapsed time. With these pieces of data, the client calculates the throughput at each client load level. At the end, the NetBench program adds all the throughput scores that the active clients reported, thus calculating the total throughput for each level of client load. The program also reports the average response time at each client load level.

SUMMARY OF FEATURES

Network-Attached Storage

■ YES ❑ NO	HP SureStore HD Server 4000	Intel InBusiness Storage Station	Linksys Instant GigaDrive	Maxtor MaxAttach 72	NetGear Network Disk Drive ND520	NSS mStor 1U	Procom NetForce 100	Quantum Snap Server
Embedded administrative software version	N/A	1	1	1.5	1.2	3.3.0	20 H	2.1
Price of tested unit	TBA	$2068	$1278	$3700	$1999	$12,000	$10,221	$3499
Capacity (unformatted)	27GB	24GB	20GB	72GB	20GB	9GB	36GB	40GB
Maximum capacity	108GB	24GB	20GB	72GB	20GB	36GB	36GB	40GB
Chassis dimensions (as tested, in inches)	16.8 x 8.5 x 17.5	2.5 x 9.0 x 11.0	3.0 x 8.0 x 11.0	2.5 x11.0 x 9.0	13.0 x 1.7 x 10.5	1.8 x 19.0 x 23.0	13.0 x 6.5 x 12.0	15.0 x 9.0 x 4.0
Available as rack-mounted/desktop unit	■■	❑■	❑■	❑■	■■	■❑	■■	❑■
Number of disk drives in tested unit	3	2	1	2	1	1	6	2
Maximum disk drives available	3	2	1	2	1	1	6	2
Hard disk manufacturer and type	Proprietary SCSI-2	Western Digital EIDE ATA/33	Seagate IDE	Maxtor UltraATA/33	IBM EIDE	IBM SCSI	IBM IDE	Quantum UltraATA/66
Mean time between failures (hours)	Info not available	63,279	40,000	Info not available	50,000	Info not available	500,000	250,000
Processor	32-bit RISC/300	Pentium MMX/266	Cyrix GXm-266GP/200	Pentium/266	Cyrix MII/266	Pentium III/500	IDT/200	Pentium/133
Operating system	VX Works	FreeBSD	Linux	MaxOS (BSD-based)	Linux	SpanStor Real Time Kernel	Proprietary	Embedded Unix derivative
Amount of RAM	32MB	32MB	32MB	32MB	16MB	256MB	32MB	64MB
SECURITY								
Access control lists (read, write, and full access)	❑	■	■	❑	❑	■	❑	❑
Administrator can create users and groups	❑	■	■	■	❑	■	■	■
Restrict access to drives and directories based on user or group name	■	■	■	■	❑	■	■	■
Implement file-level restrictions	❑	❑	❑	❑	❑	❑	❑	❑
Integrate with a Windows NT domain	■	■	❑	■	❑	■	■	■
Integrate with a NetWare NDS tree	❑	❑	❑	❑	❑	❑	❑	❑
Set disk quotas	❑	❑	■	❑	❑	❑	❑	❑
Set time restrictions	❑	❑	■	❑	❑	❑	❑	❑
MANAGEMENT								
Browser-based management	■	■	■	■	■	■	■	■
Proprietary management utility	■	❑	■	■	■	■	■	■
SNMP	■	■	❑	❑	❑	❑	■	❑
NOTIFICATION AND LOGGING								
Notifies the administrator of a problem	■	■	■	■	■	■	■	■
Means of notification	E-mail, SNMP trap	E-mail, HTML alert, LED alert	E-mail	E-mail	Audio alarm, e-mail	Page (requires external modem)	E-mail, LED alert	E-mail
Product keeps a log	■	■	■	■	❑	■	■	■
REPORTING								
User can view network usage statistics	❑	❑	❑	❑	❑	■	■	❑
User can view disk usage statistics	❑	■	■	❑	■	■	■	■
SERVER TYPES EMULATED								
NetWare	❑	❑	❑	❑	■	❑	❑	■
Microsoft Windows	■	■	■	■	■	■	■	■
Mac OS	❑	❑	■	❑	■	❑	❑	■
Unix/NFS	❑	❑	❑	❑	■	■	❑	■
Network protocols supported	IP	IP	AppleTalk, IP	IP	IP, IPX, NetBEUI	IP	IP	Appletalk, IP, IPX, NetBEUI, NFS
RESILIENCY								
RAID options	Level 5	None	None	None	None	None	Levels 0, 1, 5	Levels 0, 1
Hot-swappable disk drives	■	❑	❑	❑	❑	■	■	❑
Redundant disk drives	■	■	❑	■	❑	❑	■	■
Hot-swappable power supplies	❑	❑	❑	❑	❑	❑	■	❑
Redundant power supplies	■	❑	❑	❑	❑	❑	■	❑
SUPPORT								
Warranty	1 year on-site service	3 years	2 years	3 years	3 years	1 year	3 years	3 years

RED denotes Editors' Choice. N/A—Not applicable: The product does not have this feature.

April 2000

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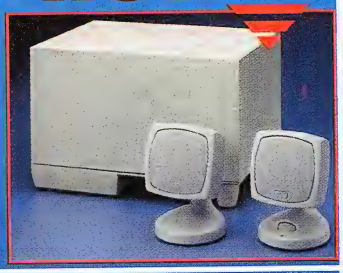


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See page 25

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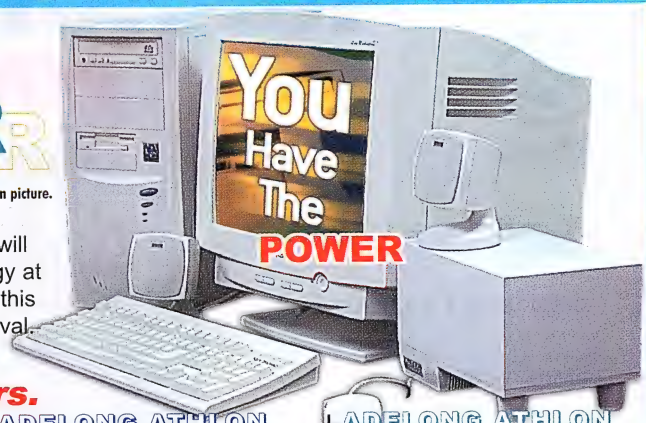
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• 56K PCI V.90 Fax/Modem	• 56K PCI V.90 Fax/Modem	• 56K PCI V.90 Fax/Modem	• 56K PCI V.90 Fax/Modem
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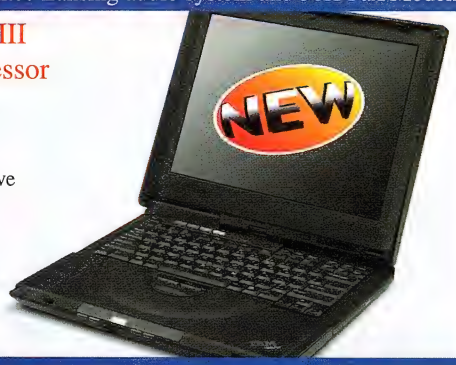
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Adelong Computers Notebooks

IBM

ThinkPad i Series

No more messing around with cables the i-series features integrated floppy, CD and hard drive. Performance is guaranteed with AGP Graphics, Altec Lansing audio system and 56K Fax/Modem.



Intel Celeron 466Mhz Processor
64MB SDRAM
6GB Hard Drive
13" HPA Display
24X CD-ROM Drive
Windows 98

$2800
NBIBM026
Rentsmart $27 per week*

Intel Celeron 466Mhz Processor
64MB SDRAM
9GB Hard Drive
14.1" TFT Display
24X CD-ROM Drive
Windows 98

$4175
NBIBM027
Rentsmart $38 per week*

Intel Pentium III 500Mhz Processor
64MB SDRAM
6GB Hard Drive
15" TFT Display
4X DVD-ROM Drive
Windows 98

$5080
NBIBM028
Rentsmart $43 per week*

ThinkPad 390X

The ultimate all-in-one business portable.



Intel Pentium II 400Mhz Processor
64MB SDRAM
6.4GB Hard Drive
NeoMagic 256AV 2.5MB SGRAM
15" TFT Display
24X CD-ROM Drive
56K V.90 Modem
Windows 98i

$5350
NBIBM029
Rentsmart $45 per week*

Intel Pentium III 450Mhz Processor
64MB SDRAM
12GB Hard Drive
NeoMagic 256AV 2.5MB VRAM
14.1" TFT Display
24X CD-ROM Drive
56K V.90 Modem
Windows 98

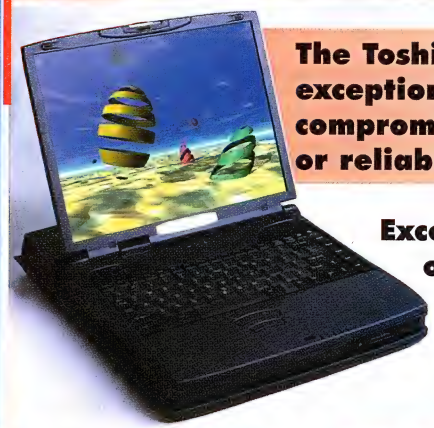
$5600
NBIBM030
Rentsmart $47 per week*

Intel Pentium III 500Mhz Processor
64MB SDRAM
12GB Hard Drive
NeoMagic 256AV 2.5MB VRAM
15" TFT Display
24X CD-ROM Drive
Windows 98

$6140
NBIBM031
Rentsmart $52 per week*

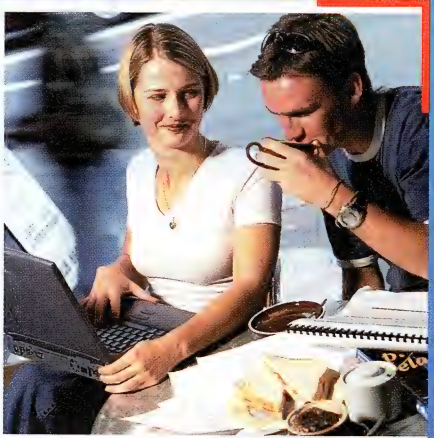
* Based on a 36 month rental

Notebooks TOSHIBA



The Toshiba Satellite provides exceptional value without compromising performance or reliability.

Excellent for multimedia, business or demanding applications, the Satellites provide solid functionality all round.



Model	Satellite 2180CDT	Satellite 2670DVD	Satellite 2650XDVD	Satellite 4280XDVD	Tecra 8100 / 450	Tecra 8100 / 500
Processor	AMD K6-2 475Mhz	Pentium III 450Mhz	Intel Celeron 466Mhz	Pentium III 500	Penntium III 450	Pentium III 500
RAM	64Mb/192Mb	64Mb/192Mb	64Mb/192Mb	64Mb/192Mb	64Mb/256Mb	64Mb/256Mb
Hard Drive	4Gb	6Gb	6Gb	6Gb	6Gb	6Gb
CD-Rom	24xCD	4xDVD	4xDVD	4xDVD	24xCD	4xDVD
Display	12.1" TFT	12.1" TFT	14.1" TFT	14.1" TFT	14.1" TFT	14.1" TFT
Modem	56K DAA	56K DAA	56K DAA	56K DAA	56K DSVD	56K DSVD
Price Rent	$3179 NBTOS069 Rentsmart $29 per week*	$3930 NBTOS067 Rentsmart $35 per week*	$4525 NBTOS068 Rentsmart $40 per week*	$5865 NBTOS066 Rentsmart $50 per week*	$6985 NBTOS070 Rentsmart $59 per week*	$7855 NBTOS071 Rentsmart $67 per week*

* Based on a 36 month rental

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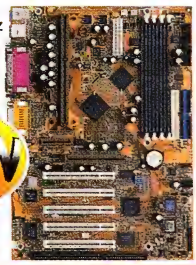
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GIGABYTE Mainboards

Dual BIOS™ Gigabyte Technology is pleased to introduce DualBIOS, a "hot spare" for your system bios. In the event that your primary BIOS fails the second BIOS backs you up almost automatically. A feature found in the GA-BX2000+ and GA-6CXC boards.

GA-6CXC

- Intel 820 Chipset
- Supports Intel Pentium II/III Processors to 733Mhz
- Supports 100/133Mhz System Bus
- 4 x PC133 DIMM slots to 1GB DRAM
- Integrated Aureal AU8810 PCI Sound
- 2 x Ultra DMA 33/66, 4 USB Ports
- 1 x AGP x4, 5 x PCI Slots, ATX
- Includes DualBios Technology



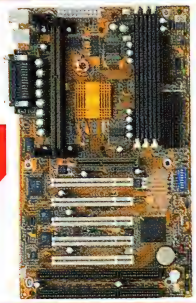
NEW

Dual BIOS™ **$325** MBGIG032

GA-71X

- AMD K7 Processor 500Mhz and Faster
- Clock Multiplier (5X – 10X)
- Supports 200Mhz Front Side Bus
- 3 x 168 Pin slots to 768MB DRAM
- 2 x Ultra DMA 33/66 Ports
- Aureal AU8810 PCI Sound AC97
- 5 x PCI, 2x ISA (shared), 1 x AGPx2
- ATX Form Factor with USB

PRICE DROP



Athlon Ready **$275** MBGIG030

GA-BX2000+

- Intel 440BX Chipset with Slot 1 Interface
- Supports 66/100/112/133/142 Mhz System Bus
- Supports up to Intel Pentium III 800Mhz
- 4 x DIMM slots to 1GB SDRAM
- 6 x PCI, 1 x ISA, 1 x AGP Slots
- 2 x UDMA 33/66, 2 x Serial, Parallel, 2 x USB
- ATX Form Factor



NEW

Dual BIOS™ **$259** MBGIG033

*Requires MSADE009 Slot 1 Adaptor

GA-5AX

- Ali Aladdin V Chipset
- Intel Pentium MMX, Cyrix to 333Mhz, AMD K6-2 / 3 to 500Mhz
- 512K L2 Cache
- 3 DIMM Slots to 768MB DRAM
- 2 x Ultra DMA 33 Ports & Serial/Parallel
- 5 x PCI, 1x ISA, 1 x AGPx4 Slots,
- ATX Form Factor with USB



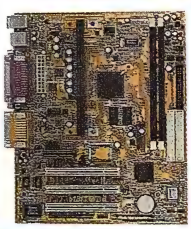
$165 MBGIG025

ABIT Mainboards

ABIT WB6 Mainboard

The WB6 is designed with the Intel's 810E chipset with an integrated high performance 3D graphics accelerator and AC97 Sound.

- Intel 810E Chipset with 66/100/133Mhz FSB
- Supports Intel Celeron* to 533Mhz, Intel Pentium II/III to 733Mhz
- 2 x DIMM slots to 512MB SDRAM
- Integrated 4MB 3D AGP Graphics Chipset
- Integrated AC97 Audio CODEC
- 2 x UDMA 33/66, 2 x USB Ports
- 3 x PCI, 1 x AMR Slots, ATX Form

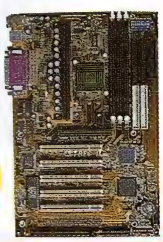


$249 MBABI004

ABIT BE6-II Mainboard

The BE6-II is the next generation of ABIT's famous BE6 motherboard. ABIT has adopted future market needs and made great improvements to create "an Ultimate BX Mainboard". Includes SoftMenuTMIII which provides ABIT's customers the easiest and safest environment to achieve ultimate performance.

- Intel BX Chipset with Slot 1 Interface
- Supports Intel Pentium III to 700Mhz, Celeron* to 533Mhz
- 3 x DIMM slots to 768MB SDRAM
- 5 x PCI, 1 x ISA, 1 x AGP Slots
- 2 x UDMA 33/66, 2 x Serial, Parallel, 2 x USB
- ATX Form Factor



NEW

$320 MBABI005

ABIT BP6 Dual Celeron Mainboard

ABIT announces the release of the World's First Dual Socket 370 motherboard, the BP6 doubly defies the limitations of Intel's BX chipset by offering both Dual Socket 370 CPUs and UDMA/66 IDE Ports satisfying even the most demanding users.

- Supports up to 2 x Celeron Processors to 500Mhz
- 3 x DIMM slots to 768MB SDRAM
- 2 x UDMA33/66 IDE Ports, 2 x UDMA33 Ports
- 1 x AGP, 5 x PCI, 2 x ISA Ports
- Onboard Serial, Parallel, USB and I/O



$295 DUAL PROCESSOR MBABI002

Adaptec SCSI

ADAPTEC 2906 PCI CARD FOR DESKTOP PCS

Connect up to 7 SCSI devices and gain great performance by moving to SCSI with the Adaptec 2906. Run your ZIP drive or Scanner up to 6 times faster than with a parallel port connection. Adaptec EZ-SCSI Software is included to help you manage your peripherals.



$115 CCGEN021

ADAPTEC 2940U2W

Unleash the full potential of your server or workstation

When it comes to boosting the performance of servers and workstations to 80Mb/s utilising Ultra2 SCSI (LVD) technology. By combining the Adaptec 2940U2W with high-performance disk drives you'll get performance worth howling about.



RETAIL KIT **$699** CCGEN018

OEM **$455** CCGEN022

ADAPTEC 2930 ULTRA

Boost you CD-Recordable or Jaz Drive to its best performance. This PCI SCSI card supports 7 internal or external devices. SCSI 1, SCSI 2 and Fast SCSI 2, SCSI 3 and Ultra SCSI protocols are all supported, it will even allow you to boot of the SCSI drives with its built in BIOS.



$190 CCADA001

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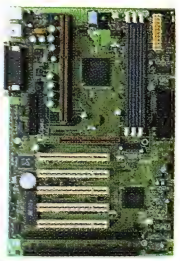
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Computers Mainboards

AOpen

AOpen AX6BC Mainboard

Introducing the AOpen AX6BC Mainboard featuring the Intel BX Chipset. A unique jumperless design, CPU monitoring & protection circuitry combines ease of use with reliability and performance. Winner of many international awards you can be sure that the AX6BC Mainboard will work with you, not against you.

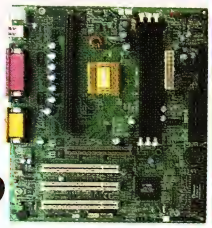


- Supports Intel Pentium II 233 - 500Mhz, Pentium III up to 700MHz & Celeron* Processors,
- 5x PCI, 2x ISA, 1x AGPx 2
- 768MB SDRAM for 3x DIMM slots
- 2x Serial, 1x Parallel, 2x USB Ports
- 2x EIDE Controller & ATX Form Factor
- Supports Wake on LAN, DMI, SB-LINK

$195 MBACE000

AOpen MX64 Mainboard

The MX64 Mainboard is part of the latest offerings from AOpen. Featuring support for Intel Celeron and Intel Pentium II/III processors to 733Mhz - making it fully compatible with the new 133Mhz Bus Speed.



- VIA694X Chipset
- Supports Slot 1 Intel Celeron*, Pentium II, Pentium III to 733Mhz
- 2 x DIMM Supports PC133 & PC100 SDRAM to 1.5GB RAM
- 3 x PCI, 1 x AGP (4x2x1x) Expansion slots
- 2 x Serial, 1 x Parallel, 4 Channel USB Port
- 2 x EIDE Ultra DMA 33/66, Integrated AC97 SoundCard

NEW

$209 MBACE009

AOpen AX63 Pro Mainboard

The AOpen AX63 Pro Mainboard brings true computing performance at a very affordable price. Powered by the advanced VIA Apollo Pro Plus AGP chipset theAX63 Pro Mainboard supports technologie s such as Jumperless design, Restable Fuse for USB & K/B, BIOS flash protection and CPU protection.



- Supports Intel Pentium II 233 - 500Mhz, Pentium III & Celeron* Processors to 700Mhz
- Supports PCI33 133Mhz RAM
- 5x PCI, 2x ISA, 1x AGPx 2 Expansion slots
- 768MB SDRAM for 3x DIMM slots
- 2x Serial, 1x Parallel, 2x USB Ports
- 2x EIDE Controller & ATX Form Factor3

$195 MBACE007

AOpen AX6C-L Mainboard

Utilising the latest Intel 820 Chipest - the AX6C-L provides incredible computing performance at a very competitive price.



- Intel 820 Chipset (Camino)
- Supports Slot 1 Intel Celeron*, Pentium II, Pentium III to 733Mhz
- 2 x RIMM slots to 1GB DRAM
- 5 x PCI, 1 x AGP (4x2x1x), 1 x AMR slots
- 2 x Serial, 1 x Parallel, 2 x USB Port
- 2 x EIDE Ultra DMA 66 , Integrated AC97 SoundCard
- ATX Form Factor

PC 133 READY

$309 MBACE012

*Requires MSADE009 Slot 1 Adaptor

Code	Model	Price
MSADE009	Slot 1 to PPGA Celeron Adaptor	$20

Code	Model	Price
MSADE016	Slot 1 to FCPGA PIII Adaptor	$28

CD-ROM & DVD Drives

AOpen

AOpen 48X EIDE CD-ROM

$95 MMACE001

AOpen 10X DVD-ROM CD-ROM

BONUS DVD SOFTWARE

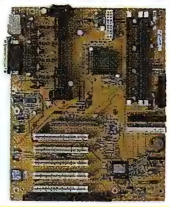
$225 MMACE009

Mainboards

FIC

1st Mainboard

The first mainboards on the market to support the Athlon™ processor and recommended by AMD. The ATX sized FIC SD11 supports the AMD Athlon™ processor at mouth watering speeds of 500-850 MHz



- Supports AMD Athlon Processor 500-850Mhz @ 200Mhz System bus
- AMD 751 and VIA 686A Chipset
- Up to 768MB SDRAM for 3 x DIMM Slots
- 2 x EIDE Controller with UDMA/66
- 1 x Serial, 1 x Parallel, 2 x USB Ports
- 1 x AGP, 5 x PCI, 1 x ISA Expansion Slots

PRICE DROP

$260 MBFIC000

Memory

SDRAM

- 168 Pin DIMM Module
- For use with Cyrix, AMD K6-2/3 & Athlon, Intel Pentium II/III & Celeron Processors



Code	Model	Price
RAGEN024	32MB PC100 SDRAM	$85
RAGEN022	64MB PC100 SDRAM	$125
RAGEN023	128MB PC100 SDRAM	$245
RAGEN025	256MB PC100 SDRAM	$995

133Mhz SDRAM

- 133Mhz 168Pin DIMM Module
- Designed for use with Intel Pentium III Processors equipped with 133Mhz Front Side Bus
- Compatible with existing PC100 Mainboards

Code	Model	Price
RAGEN029	64MB PC133 SDRAM	$140
RAGEN030	128MB PC133 SDRAM	$270

ECC SDRAM

- Provides error checking and corrections for servers and workstations.



Code	Model	Price
RAGEN028	64MB ECC SDRAM	$225
RAGEN026	128MB ECC SDRAM	$475
RAGEN027	256MB ECC SDRAM	$1225

EDO RAM

- 32-bit Memory
- Use with 486 and older Pentium systems
- Used in Pairs in Pentium Systems



Code	Model	Price
RAGEN005	16MB EDO SIMM 72Pin	$79
RAGEN006	32MB EDO SIMM 72Pin	$145

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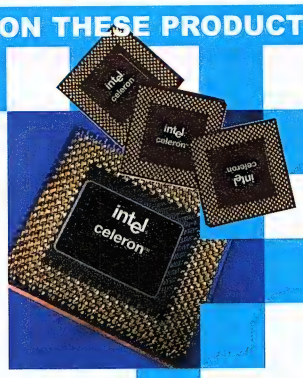


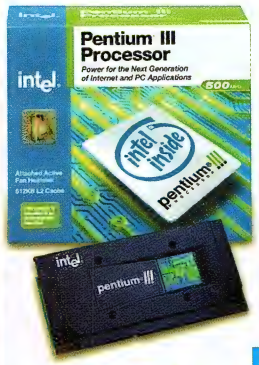
Performance for the Home and Office Needs
Intel Celeron Processor

Get great performance for your personal computing and office needs with the Intel Celeron Processors. Intel Celeron processors give you quick, responsive performance for today's business applications and provide cost-effective managed client solutions for any environment.

NEW

Code	Model	Price
CPINT029	Celeron 433Mhz PPGA	$185
CPINT030	Celeron 466Mhz PPGA	$200
CPINT032	Celeron 500Mhz PPGA	$250
CPINT048	Celeron 533Mhz PPGA	$340





Ultimate Gaming and Multimedia
Intel Pentium III Processor

The new range of Intel Pentium III Processors feature 256Kb of Advanced Transfer Cache - a mechanism which matches the cache speed to the speed of the processor. Available in 100Mhz and 133Mhz front side bus speeds.

See page 7 & 8 for the new range of 133Mhz mainboards.

Code	Model	System Bus Frequency (Mhz)	L2 Cache Size (kb)	L2 Cache Type	Price
CPINT050	Pentium III 500E	100Mhz	256	ATC	$525
CPINT028	Pentium III 500	100Mhz	512	Discrete	$525
CPINT031	Pentium III 550	100Mhz	512	Discrete	$595
CPINT040	Pentium III 550E	100Mhz	256	ATC	$595
CPINT041	Pentium III 600E	100Mhz	256	ATC	$675
CPINT043	Pentium III 650	100Mhz	256	ATC	$870
CPINT045	Pentium III 700	100Mhz	256	ATC	$1125
CPINT049	Pentium III 750	100Mhz	256	ATC	$1399
CPINT052	Pentium III 800	100Mhz	256	ATC	$1725
CPINT047	Pentium III 533EB	133Mhz	256	ATC	$549
CPINT038	Pentium III 533B	133Mhz	512	Discrete	$549
CPINT042	Pentium III 600EB	133Mhz	256	ATC	$675
CPINT039	Pentium III 600B	133Mhz	512	Discrete	$675
CPINT044	Pentium III 667	133Mhz	256	ATC	$885
CPINT046	Pentium III 733	133Mhz	256	ATC	$1245
CPINT051	Pentium III 800EB	133Mhz	256	ATC	$1755

NEW

Excellent performance for those on a budget.
AMD K6-2 Processors

The AMD K6 II range of socket 7 processors provide the power to run today's hottest games and multimedia software.

3Dnow! Technology provides extended multimedia performance and capability

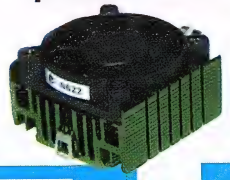
NEW

Code	Model	Price
CPAMD019	AMD K6-2 500	$139
CPAMD028	AMD K6-2 550	$269

Heatsink and Fan

Socket 7 CPU Fan

$15 MSADE006



AMD Athlon™ Processor

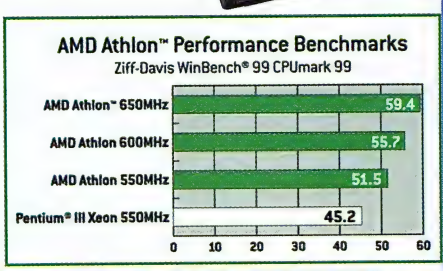
The AMD Athlon™ Processor is the world's most powerful engine for x86 computing, as well as industry's first seventh-generation x86 microarchitecture. The AMD Athlon processor family is designed to power the next generation in x86 platforms. Professionals working with image processing, CAD and digital content creation will benefit from the superior processing power of the Athlon Processor. Computing enthusiasts who want the highest performance to run the latest 3D games and multimedia will demand desktop powered by the Athlon Processor.

Code	Model	Price
CPAMD022	AMD Athlon Processor 600Mhz	$495
CPAMD023	AMD Athlon Processor 650Mhz	$560
CPAMD025	AMD Athlon Processor 700Mhz	$670
CPAMD026	AMD Athlon Processor 750Mhz	$895
CPAMD027	AMD Athlon Processor 800Mhz	$1295
CPAMD029	AMD Athlon Processor 850Mhz	$1795

BONUS FAN HEATSINK



- Slot A Architecture
- L1 Cache size 128Kb
- Supports Enhanced 3DNOW™ and MMX
- System Bus Speed 200Mhz for data intensive applications
- Multiprocessor Capable for future expansion



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Adelong Computers — Hard Drive

Quantum Fireball™ Plus LM

NEW

For power users, data protection is just as important as performance. In seconds, DPS lets users verify drive integrity and protect their data, thereby avoiding unnecessary drive returns, while SPS guards against one of the leading causes of hard disk drive failures - damage during handling and integration.

• Ultra ATA/66 Interface • 8.5ms Access Time • 2MB Cache • 7200 RPM Spindle

Quantum®

Code	Capacity	Price
HDQTM078	10GB	$310
HDQTM079	15GB	$365
HDQTM080	20.5GB	$599
HDQTM081	30GB	$Call

Quantum Atlas IV

Quantum's Atlas™ IV 7,200 RPM hard disk drives are the industry's first drives that support the backward-compatible Ultra160 SCSI interface for mainstream servers, workstations, and storage subsystems. With a 6.9 millisecond (ms) average seek time the Atlas IV drive is a cost-effective solution that delivers high-I/O, high-throughput performance with outstanding reliability.

Code	Capacity	Interface	Price
HDQTM055	9.1GB	Ultra Wide 68 Pin	$585
HDQTM074	18.2GB	Ultra Wide 68 Pin	$925
HDQTM075	36.4GB	Ultra Wide 68 Pin	$2025

Fully compatible with UW SCSI, U2W SCSI and Ultra 160M.

Quantum Atlas 10K

Exceptional Performance and Reliability for Servers, Workstations, and Storage Subsystems Quantum Atlas™ 10K disk drives-with a 10,000 RPM rotational speed, a 5.0 ms seek time the Altas has set a new standard of performance for enterprise and workstation drive

Code	Capacity	Interface	Price
HDQTM076	9.1GB	Ultra Wide 68 Pin	$765
HDQTM073	18.2GB	Ultra Wide 68 Pin	$1225
HDQTM077	36.4GB	Ultra Wide 68 Pin	$2175

Also available in 80 Pin SCSI. Call for details

Quantum Fireball™ LCt

Intelligently Priced Leading-Edge Performance Featuring a 9.5 ms seek time, a 512 kilobyte (KB) buffer, and a 5,400 RPM rotational speed, Fireball lct hard drives deliver the performance needed for the most demanding home and small-business applications. To ensure optimum throughput, Fireball lct drives feature the Quantum-developed, high-performance Ultra ATA/66 interface, which virtually doubles the burst data rate.

VALUE

Code	Capacity	Price
HDQTM064	4.3GB	$141
HDQTM065	8.4GB	$166
HDQTM066	13GB	$192
HDQTM067	17.3GB	$209
HDQTM070	20.4GB	$224
HDQTM072	30GB	$342

Deskstar

Extending leadership in storage capacity and performance in the desktop market with 2MB of cache and a rotational speed of 7200 RPM as standard.

Winbench99 test show 7200RPM hard drives delivered 15% improvement in performance

IBM®

Code	Capacity	Price
HDIBM042	13.5GB	$325
HDIBM046	20.5GB	$485
HDIBM045	27GB	$565
HDIBM047	34GB	$735

HITACHI

Notebook HardDrive

NEW

The newest Ultra DMA 2.5-inch products use state of the art component technologies, including GMR heads and digital MEEPRML read channels to achieve higher data density and faster data throughput. These drives feature S.M.A.R.T. support and shock sensors for additional reliability.

Code	Capacity	Height	Price
HDHIT006	4.8GB	9.5mm	$345
HDHIT004	6.5GB	9.5mm	$555
HDHIT005	10GB	12.7mm	$665
HDHIT007	12GB	12.7mm	$745

Western Digital

Desktop EIDE Drives

The WD Caviar family is the ideal solution for desktop personal computers and provides the best combination of performance and value for entry-level to mainstream PCs.

Code	Size (GB)*	Seek	RPM	Cache	Price
HDWES004	8.4GB	9.5ms	5400	2MB	$235
HDWES005	10.2GB	9.5ms	5400	2MB	$255
HDWES006	13.6GB	9.5ms	5400	2MB	$275
HDWES007	20.5GB	9.5ms	5400	2MB	$345
HDWES010	27GB	9.5ms	5400	2MB	$495
HDWES011	30.7GB	9.5ms	5400	2MB	$545

NEW

Performance EIDE Drives

Designed for high-end desktop PCs and single user workstations, WD Expert drives outperform ordinary EIDE and even low-end SCSI solutions with average speeds 20 percent fast than conventional 5400 RPM EIDE drives.

Code	Size (GB)*	Seek	RPM	Cache	Price
HDWES008	9.1GB	9ms	7200	2MB	$275
HDWES012	13.1GB	9ms	7200	2MB	$295
HDWES013	20.5GB	9ms	7200	2MB	$399
HDWES014	27.3GB	9ms	7200	2MB	$525

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Sydney NSW 2000
Ph: (02) 9267 5272
Fax: (02) 9267 5042

DIAMOND

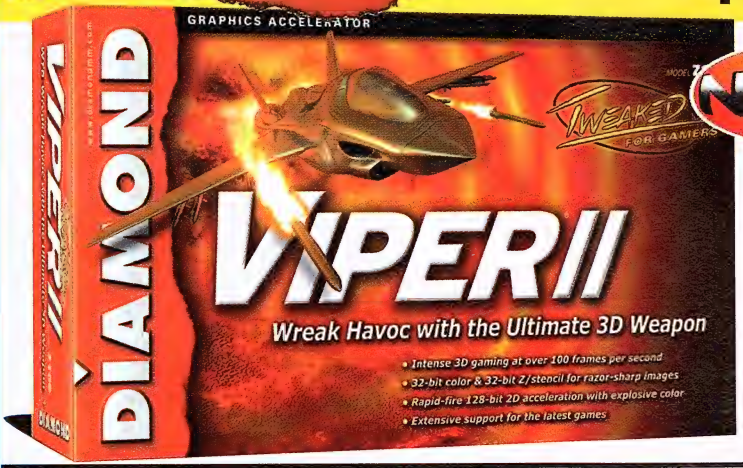
Multimedia

Computers

www.diamondmm.com

DIAMOND

Viper II



NEW

Who Said Anything About Playing Fair?

Give yourself an unrivaled games advantage. The Viper II graphics card is equipped with 4X AGP power and a transformation and lighting engine for the most realistic images ever. Features include 32MB of high-speed memory, 128-bit acceleration, and S3TC texture compression, hurling 15 million triangles at your monitor every second for the most intense 3D action ever.

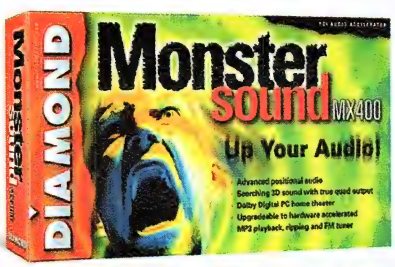
Viper II 32MB **$389** DCDIA032

Monster Sound MX400

UP YOUR AUDIO!

Diamond's Monster Sound MX400 delivers PC audio hardware acceleration for hardcore PC gamer's and digital audio enthusiasts. Add the Rio PC upgrade for hardware accelerated MP3 playback, ripping and FM tuner for a whole new twist for your PC audio experience.

· Advanced positional audio technology
· Scorching 3D sound with TRUE quad output
· Dolby Digital for PC home theatre



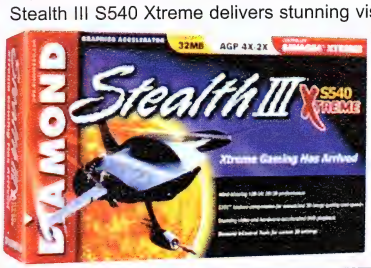
NEW

$165 MMDIA026

Stealth III S540

Xtreme gaming has arrived!

Stealth III S540 Xtreme delivers robust 2D/3D features and speedy performance at an unbelievable price. Based on the S3 Savage4 Xtreme chipset and featuring S3TC texture compression, integrated advanced 3D quality features include 128-bit processing, 32MB of memory, up to AGP 4X support, a 32-bit 3D rendering pipeline and massive texture processing, Stealth III S540 Xtreme delivers stunning visual quality at blazing speeds for the hottest 3D games.



32MB PCI **$205** DCDIA031

32MB AGP OEM **$225** DCDIA023

Xtreme **$265** DCDIA030

Supra Express 56e

Award-Winning Preformance

Diamond's SupraExpress 56e is a powerful external modem. Designed to deliver award-winning 56K performance over a wide variety of line conditions, the SupraExpress gives you faster and more dependable Internet access. Offering incredible value, it is packaged with everything you need for fax, Internet and voicemail.

· 56K ITU Standard
· 230Kbps throughput
· External reset switch



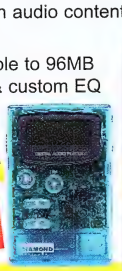
$149 FMDIA000

Rio 500

The Whole World is listening

The Rio 500 puts the power of digital audio in the palm of your hand! Rio 500 is skip-free, portable audio player that hold up to two hours of digital quality music and up to 32 hours of spoken audio content. Rio is the perfect companion for people on the go.

- 64MB built-in memory - Expandable to 96MB
- Back-lit LCD display with preset & custom EQ functions
- 13 hours continuous playback with single AA Battery



$499 MMDIA015 HOT

32MB Flash Memory Card **$199** MMDIA016



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POWERED BY MATROX G400 SERIES

The Millennium G400

Fitted with 16 or 32MB of fixed, high-speed SGRAM, the Millennium G400 provides lightning fast, ultra-crisp displays with its 300 MHz RAMDAC, while at the same time delivering stunningly realistic image quality in the most demanding business and home applications without compromising performance.

G400 RETAIL 16MB	$340	DCMAT033
G400 RETAIL 32MB	$430	DCMAT034
G400 16MB OEM	$285	DCMAT036
G400 32MB OEM	$385	DCMAT037

The Millennium G400 Series

A powerhouse of breakthrough technologies and next-generation features, the Millennium G400 Series of graphics boards are outfitted with Matrox's unique DualHead Display feature, built-in support for true Microsoft® DirectX™ 6 Environment-Mapped Bump Mapping and trademark Vibrant Color Quality² rendering. It is these unequaled, must-have features which not only distinguish them from all other graphics solutions, but which revolutionizes the way you use computers.

The Millennium G400 MAX

The Millennium G400 MAX is fitted with a fixed 32MB of high-bandwidth SGRAM and is supercharged with a 360 MHz UltraSharp RAMDAC capable of driving high-end monitors at resolutions of up to 2048 x 1536, 32-bpp at 85Hz. Targeted directly at the accept-no-compromise PC gamer and at professionals who require an exceptionally large desktop display, the Millennium G400 MAX slams the performance gear into overdrive with an increase in raw speed of more than 30 per cent over the Millennium G400.

G400 MAX 32MB AGP	$470	DCMAT035

Gaming Cards

3D PROPHET

Featuring GeForce 256™ DDR

Hercules

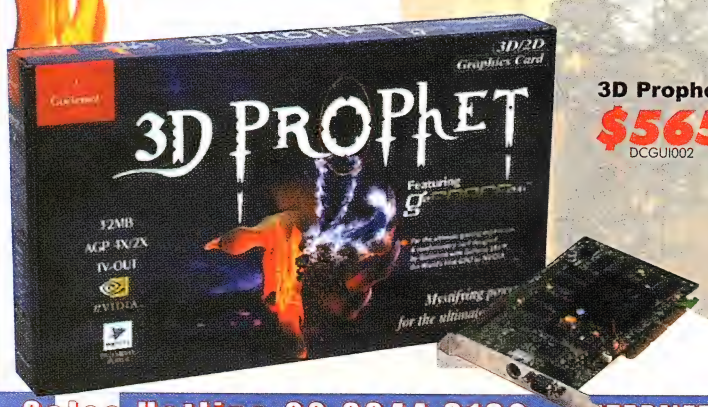
Guillemot

Mystifying Powers for the Ultimate in 3D

3D Prophet is built on the revolutionary NVIDIA's GeForce 256™ 3D processor making it the highest performing and the most feature-rich graphics card you have ever seen.

Integrates the world's first Graphics Processing Unit (GPU), the 256-bit GeForce, generating up to 15 million triangles per second and 480 million pixels per second.

- 32MB high-speed memory
- 4X AGP for Fast Writes
- 4 Engines comprising
- Hardware transform engine
- Hardware lighting engine (8 hardware lights)
- 256-bit rendering engine for true 32-bit games
- 100% Hardware triangle setup
- Outstanding resolutions up to 1920 x 1440 in 16 million colors and 2048x1536 in 65,000 colors performed with a 350MHzZ RAMDAC
- Built in hardware acceleration for DVD-Video playback and TV-Out feature (NTSC and PAL)
- Supports DirectX 7 and OpenGL for advanced 3D functionality



3D Prophet
$565
DCGUI002

3D Prophet with DDR
$665
DCGUI001

Features Double Data RAM (DDR), effectively doubling the transfer speed of the RAM



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Magic 4MB AGP

The Magic 4MB AGP Graphics Accelerator is ideal for budget upgrades.



NEW

$45
DCMAG005

For higher performance and TV output capabilities, look no further than the Magic 8MB AGP Accelerator.

$85
DCMAG022

Magic TNT2 M64

The Magic M64 utilising the nVIDIA TNT2 128-bit chipset features award winning performance at a competitive price. Featuring 32MB of SDRAM and a 300Mhz RAMDAC for crystal clear resolution, the M64 is ideal for graphics, hardcore gaming and watching DVD action in full screen mode.



$179
DCMAG020

Magic TNT2

The Magic TNT2 using the nVIDIA RIVA TNT2 chipset is the fastest and meanest gaming card on the market today. Featuring a 300Mhz RAMDAC, the Magic TNT2 supports resolutions up to 2048 x 1536 with ease. Loaded with 32MB of ultra quick SGRAM the Magic TNT2 offers complete support of 3D textures and is optimized for Pentium III and AMD 3DNow systems.



PRICE DROP

Ultra + TV Out
$285
DCMAG023

Magic TV

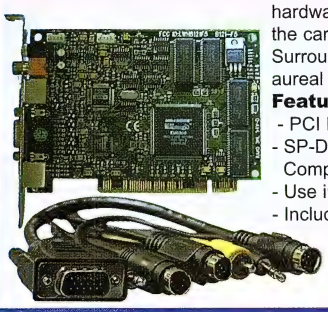
Watch full screen TV on your PC with the FlyVideo TV Card. Capture live video & images from your VCR or Camcorder, or use a CCD Camera and video-conference over a LAN or Internet. Teletext included with FM radio.



TV Card/Remote/FM Radio
$135
MMMAG002

MagicSTAR MPEG-2 Card

DVD and VCD titles can be experienced the way producers intended them to be seen with the MagicSTAR decoder card. Incorporating specialized hardware to accelerate your MPEG-1/2 video - the card also features Dolby Digital AC-3 Surround sound decoding for an amazing aureal experience.



Features:
- PCI MPEG-2 Decoder Card & Cables
- SP-DIF and TV-Output (S-Video and Composite)
- Use in addition to your existing graphics card
- Includes RealMagic DVD playback software

$165 DCMAG024

Magic Link



Simple, portable and fast link for transfering files between 2 USB-enabled computers. A must for notebook & mobile users. Software & 6ft cable included.

$55
NWMAG001

See Page 31 for a great range of USB products

Magic Toplan

TopLan is a USB to USB Host connector allowing two or more computers to share programs, files and peripherals such as printers with ease. Multiple network nodes supported to a super-fast 12Mbps under Network Neighborhood in Windows 98. Simple PnP installation ideal for multi-player gamers & those with more than one computer. Pack includes a TopLan Host and 2 x 1.8m USB cables.



$125 NWMAG000

Magic Theater Pro



Magic Theater Pro 5.1 Channel system will deliver Hi-Fi and true Dolby Digital AC-3 sound on your PC with today's games and movie titles. Comes complete with a Magic Sound Live! PCI soundcard and a speaker system consisting of a subwoofer, 4 satellites and a center channel delivering a total of 47 Watts RMS.

$379
MMMAG003

DOLBY DIGITAL

Computers Speakers

ALTEC LANSING

MORE PREFORMANCE AWARDS THAN ANY OTHER BRAND OF COMPUTERS SPEAKER

ACS22 Tower Speaker System

Powerful sound from a two tower system

Ideal for those consumers who need excellent PC audio output, either for teleconferencing, games or music CDs, but who do not have a requirement for a subwoofer. Excellent value for money.

- Small footprint with headphone output
- 5 Watts RMS Power
- Produces powerful audio output from two satellites



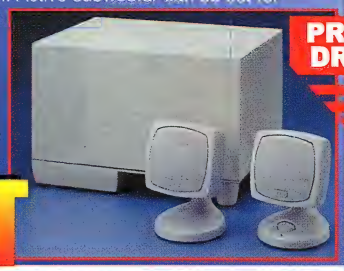
$65
MMALT008

ACS33 PowerCube Speaker

3-Piece system dramatically enhances PC Audio

The PowerCube Speaker system with its compact satellites delivers powerful audio playback from a 3-piece system. Active subwoofer can be set for desired bass response and the electronic controls on the satellites adjust the volume for both satellites and subwoofer simultaneously.

- 10 Watts Satellite Power
- Volume control and Power ON L.E.D
- 15 Watts Subwoofer Power



PRICE DROP

$99 MMALT005 **HOT**

ACS45.1 PowerCube Speaker

Proven Sonic Performance at an amazing price.

Introducing the Altec Lansing ACS45.1 PowerCube Speakers, a three piece multimedia audio solution at an unbelievable price. Experience the enhanced output of the PowerCube satellite system . Great for games and CD's, the ACS45.1 will bring hi-fi audio to your computer desktop today.

- 12 Watts Satellite Power
- 3" full range driver
- 20 Watts RMS
- 6" subwoofer



PC MAGAZINE AUSTRALIA EDITORS' CHOICE

$175
MMALT001

ACS48 PowerCube Speaker

The PowerCube Speaker System, from Altec Lansing is the markets leading affordable audiophile multimedia audio solution for the home or office. Comprising of a 3 unit system, allows you to experience hi-fi quality audio from your CDs, games or the Internet. In addition, the Powercube Plus 6" subwoofer is encased in wood, offering you a deeper low frequency response.

- 40 Watts RMS Satellite Speakers
- 3" full range driver
- 3/4" high frequency driver
- 40 Watts RMS, 6" subwoofer



PC MAGAZINE AUSTRALIA EDITORS' CHOICE

$265
MMALT003

ACS54 PowerPlay Plus Speaker

5-Piece system designed especially for the sound demands of gamer's. PowerPlay Plus is the only speaker system designed especially for gamer's that provide high quality, powerful surround sound game audio output. This 5-piece system provide a true multidimensional surround sound experience

- 20 Watts Satellite Power
- 20 Watts Subwoofer Power
- Unique Bracket/stands provide convenient mounting possibilities for surround speaker



$225
MMALT009

ADA880 Dolby Digital

The ADA 880 combines 80 watts pure power, sophisticated electronic circuitry, and Altec Lansing's patented speaker technology to bring crisp, thunderous Dolby Digital audio to your desktop. The ADA 880 also features detachable rear surround speakers to create the ultimate surround sound environment available today.

- Automatically detects the signal source and output to either Dolby Digital, Dolby ProLogic, or Stereo
- Satellites can be placed near without disturbing images.
- Control of all audio functions at your fingertips



$599
MMALT010

Audio

TERRATEC PROMEDIA

M3Po



The internationally accepted MP3 format lets audio data be reduced to one eleventh of its original size – with hardly any change in quality. TerraTec´s m3po™ is a CD player to complement a conventional hi-fi set. The device plays MP3 as well as conventional CDs. Regardless of whether or not you buy them in a store or burn them yourself: after inserting a CD m3po™ searches the medium for MP3 files and playlist. It doesn't matter which directory they are located in. Using a shuttle, titles can be selected and started very easily thanks to clear and comfortable menu directions.

$995 MMTER000

Sound System DMX



Sets new standards in ultimate performance. The latest PCI technology, uncompromising audio quality coupled with a solid software bundle and universal compatibility makes the DMX a real contender. Features include the two CD-Audio connector, external wavetable connector, ActiveRadio RDS radio module expansion and digital I/O in both S/PDIF co-axial and TOS-Link optical format make the SoundSystem DMX a cutting edge product in the true tradition of TerraTec.

$349 MMTER001

XLerate PRO

The XLerate Pro takes immersion to new heights Aureal have enhanced their Head Related Transfer Function based A3D surround algorithm and increased the actual processing capability of the Vortex chip itself with astonishing results. A3D 2.0 now supports Wavetracing to enable simulation of reflections and occlusions (in other words, the way sound changes due to the acoustics of the environment that you're in). The end result simply has to be heard to be believed



$199 MMTER002

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Adelong Computers



Montego II QUADZILLA

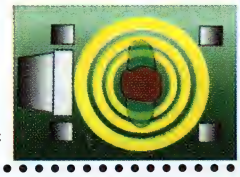
The total 3D gaming experience!

The gamer's choice for the best in 3D audio just got better. Introducing the new montego II Quadzilla from Turtle Beach. Armed with the very latest Wavetracing™ technology, Quadzilla submerses you in the astounding 3D audio world of the hottest new games and websites with realistic three-dimensional audio images. And with stereo S/PDIF digital output, you get the best theater quality surround sound for your PC.

Four Speaker 4 Surround Support

- A3D 2.0 positional audio with four speaker support and S/PDIF digital output
- High-quality audio performance with 97 dB signal-to-noise ratio
- 320 voice PCI wavetable synthesis
- Includes Voyetra Software Suite

$329
MMTUR002
A3D Quadraphonic



Montego II



$159
MMTUR004

With advanced features such as high-speed bus-mastering scatter-gather PCI audio interface, DirectSound acceleration, 320 voice wavetable synthesis, A3D positional audio for realistic gaming effects, hardware-based, full-duplex record/playback at full bandwidth and 96 DMA channels, Montego II maximizes your multimedia experience by delivering state-of-the art audio performance! Montego II also runs legacy DOS games,* so you can supercharge Windows audio without giving up DOS games compatibility

- Internet-ready with enhanced stereo full-duplex audio
- Supports all of the latest PC audio standards
- High-resolution, 18-bit converters
- 10 Band Hardware Equalizer
- Greater than 97 dB signal to noise ratio
- Experience the thrill of Aureal A3D

PC GAMES COMPATIBLE · HARDWARE FULL DUPLEX ENHANCED · INTERNET READY · GENERAL MIDI · Voyetra

RICOH CR-RW Drives

MP7080A
CD-R/RW Drive

8x4x32x Record ReWrite Read

NEW

$580 MMRIC014



BUFFER MEMORY 4MB
WRITING/READING SPEED Writing: 1x, 2x, 4x, 8x, (CD-R) Reading: 32xMax
AVERAGE ACCESS TIME 120msec. (32x)

Also available MP7060S 6x SCSI **$625** MMRIC008

MP8040SE
Portable CD-R/RW Drive

4x4x20x Record ReWrite Read

LapTop Ready*



BUFFER MEMORY: 2MB
WRITING/READING SPEED: Writing: 4x(CD-R), 4x(CD-RW) Reading: Max. 20x (CAV)
AVERAGE ACCESS TIME: Less than 150msec. (20x)

SCSI **$885** MMRIC009

FORMATTED MEDIA



(1x4x)CD-RW Disc 74 Mins 650Mb **$12** MMRIC003

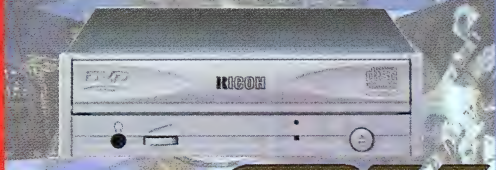


CD-R Type 74 Lite Jackets 10 pack 74 Mins 650Mb **$26** MMRIC011



- CD-R Disc 74 Mins 650Mb 8xSpeed 10pack **$27** MMRIC012
- CD-R Disc 74 Mins 650Mb **$3** MMRIC004
- 80Min 700Mb 12x Speed **$3** MMRIC013

MP9060A
CD-R/RW Drive & DVD-ROM Drive



6x4x24x & 4x Record ReWrite Read DVD Read

BUFFER MEMORY 2MB
WRITING/READING SPEED Writing: 6x (CD-R), 4x (CD-RW) Reading: 24xMax (CD-RW/CD-R/CD-ROM), 4x(DVD-R)
AVERAGE ACCESS TIME 120msec. (CD-RW/CD-R/CD-ROM) 200MSEC (DVD-ROM)

EIDE **$650** MMRIC010

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Zip 250 USB



All the benefits of the Zip 250 plus all the advanced features of the USB technology. True hot plugging technology and super fast USB connection. The new drive is compatible with both Windows and Macintosh, it also features a compact ultra thin case.

$310 BUIOM040

250MB Zip + PCMCIA Bundle

NEW **$385** BUIOM043



Zip 250

zip 250

SuperFloppy Preferred By Millions

The new drive comes in two flavors: parallel port (for PC's) and SCSI (for Mac's or PC's with a SCSI connection). Zip 250 SCSI drive users will benefit from a performance boost, up to 56 times faster than standard floppy drives and 1.4 times faster than external CD-ROM drives. Best of all, current Zip 100 drive users need not worry about their investment in 100MB Zip using 250MB media).

- 50% faster than the original Zip 100 drive.
- Large 250Mb Capacity
- Compatible with 100Mb Zip Disk
- Proven Reliability

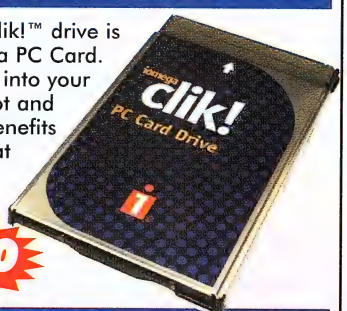


BUIOM033	PARALLEL	**$289**
BUIOM032	SCSI	**$289**
BUIOM044	Internal IDE	**$285**

Clik! PC Card

clik! 40

This new Clik!™ drive is the size of a PC Card. Just slide it into your PCMCIA slot and have the benefits of super fast 40Mb storage that the Clik technology provides. Perfect for your digital pictures or large multimedia files.



$340 BUIOM041

Clik!

clik! 40

Clik!™ drive can store 40Mb of data on a Clik! Disk. The Click Drive not only reads your Clik! Disk but also your Compact Flash and Smartmedia cards. The Mobile Clik! Drive connects to your printer port using a pass through technology and can run on rechargeable batteries for mobile applications. There is even a Type II PC Card that will connect your Clik! Drive up to your notebook. (Clik Drive Plus)



BUIOM035	Clik Drive	**$355**
BUIOM036	Clik Drive Plus	**$428**
BUIOM037	Clik 40MB Disk	**$35**

Zip Drives

Increase your storage quickly, easily and economically - as you need it. With a 100MB Zip Drive you can take your data anywhere at anytime. Each disk stores 100MB of data and you can add them, as your needs grow. Available in Parallel, SCSI, Internal IDE and the new USB interface. You also get Zip tools on CD.

IDE ATAPI **$145** BUIOM007

Ext. Parallel **$199**



Drives

BUIOM000	100MB EXT PARALLEL ZIP Drive	**$199**
BUIOM026	100MB USB ZIP Drive	**$235**

Jaz 2GB Drive

jaz 2GB

The new Jaz Drives hold a whopping 2GB of data per disk. Best of all these drives are fast and backwards compatible with the industry standard 1GB disk. Stream & capture video, backup data and store images are just some of the applications that the Jaz Drive can be used for. SCSI Card needed.

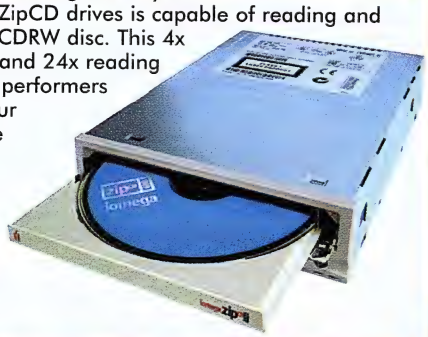


INTERNAL **$639** BUIOM017

EXTERNAL **$639** BUIOM018

Zip CD

The internal Zip CD drive is a great way to archive data and software at a low cost. ZipCD drives is capable of reading and writing CDR as well as CDRW disc. This 4x recording, 4x rewriting and 24x reading drive is one of the best performers on the market. Trust your archiving to Iomega the archiving specialist.



INTERNAL **$375** BUIOM042

Accessories for Zip

BUIOM034	250MB ZIP Disk	**$35**
BUIOM012	100MB PC ZIP Disk	**$24**
BUIOM005	100MB PC ZIP Disk (3 Pack)	**$63**
BUIOM006	100MB PC ZIP Disk (10 Pack)	**$190**
BUIOM022	ZIP Card, PCMCIA to SCSI	**$185**

Accessories for Jaz

BUIOM024	JAZ 2GB Disk	**$195**
BUIOM025	JAZ 2GB Disk (3 Pack)	**$559**
BUIOM031	JAZ PCMCIA to SCSI Converter	**$215**
BUIOM013	JAZ Traveller, SCSI to Parallel	**$85**

Verbatim Smart and Friendly

CD-RW/CD-R

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CD Pocket RW 4x4x20

INCLUDES EASY CD CREATOR, SCALA MM200 & OTHER SOFTWARE TO THE VALUE OF $2018



The Smart and Friendly CD Pocket RW from Verbatim is a truly portable 4X Write, 4X ReWrite and 20X Playback CD Recorder with a 2MB Buffer. Weighing just 500 grams, the CD Pocket RW is designed specifically for portability. Rechargeable battery pack is designed to write up to 6 CD's at 4X Speed without recharging. Comes with software and a PCMCIA host adaptor.

$1095 MMVER009

20x PCMCIA CD-ROM Drive

Connect a 20X CD-ROM Drive to your notebook PC today via the PCMCIA port. The slim-line tray design reduces the size of the unit making it portable and lightweight.



DVD Version Also Available $759 MMVER015

$325 MMVER008

CD-RW Discs



$8 MMVER004

CD-R Pack of 10



$25 MMVER000

DataLife Diskettes



$6 FDVER000

FDVER001 Teflon Coated $6.50

CD-R Discs 80 Min CD-R



$3 MMVER014

PCI Enhanced Two Parallel Port Card

NEW



I/O FLEX-PCI I/O Card
Advanced Automated Flow Control Port

- 128-byte FIFO UARTs
- 32-bit PCI Bus for 3 Time Faster Trans
- Fully Windows 95 and 98 Plug N-Play

Add two super fast Parallel Port interfaces to any PCI equipment PC. You can now use multiple parallel port devices without using a switcher box or pass through connectors. The plug and play connectivity of the card eliminates installation hassles, and makes system expansion a breeze.

$99 CCVER005

PCI FIREWIRE CARD

NEW



Update your PC with Firewire! Supports transfer rates of up to 400Mbit/s and includes three external ports and one internal port. With the included Ulead Video Software and IEEE 1394 cable you can download directly from your digital video camera straight to your hard drive.

$199 CCVER000

PCI IDE Ultra DMA 66 Card

Speed up your PC's new hard disk drives with this PCI plug in Ultra DMA 66 Card. Supports transfer speeds of up to 66MB/s with new ATA 66 drives, and includes the ability to run up to 4 extra IDE or ATAPI drives on your system.

DMA 66 Control Card
New Technologies for the Ultra ATA/66 Controller



NEW

$99 CCVER0040

PCI SCSI Cards

Expand and enhance your PC with a PCI SCSI Card. Common IDE drives in today's PC's slow down your machine every time they read or write to a drive. SCSI works almost completely independently of your PC allowing it to run faster during drive activity. Each SCSI card can run 7 or more SCSI devices providing the best possible expansion abilities.



PCI Bus, Ultra-SCSI 20Mb/s with bootable BIOS. Supports up to 7 devices Internet 50 pin cable provided

$109 CCVER001



PCI Bus, Ultra-Wide SCSI 40Mb/s with bootable BIOS. Supports up to 15 devices. Internet 50 pin & 68 pin cables provided

$199 CCVER002



PCI Bus, Ultra2-Wide SCSI 80Mb/s with bootable BIOS. Supports up to 15 devices. Internet 50 pin & 68 pin cables provided.

$299 CCVER003

Sales Staff are Available (est)
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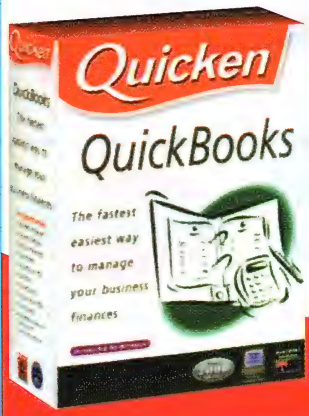
Adelong Computers Software

Quicken

QuickBooks V7

Your complete business finance solution! Designed especially for small and medium businesses with inventory and double entry accounting demands.

Tracks bank balances, loans & other finances, calculates charges on overdue payments, monitors unpaid bills, writes and prints cheques, records stock and provides 79 financial graphs & reports.

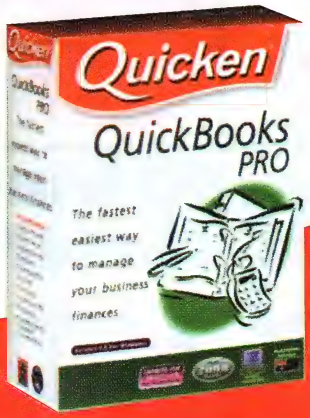


$179 SWQIK014

QuickBooks Pro V7

Take control of your business.
Includes all the features of QuickBooks, plus allocates staff time and material costs to jobs or projects. Create professional estimates, then create invoices straight from these estimates. 90 reports & graphs give an instant, clear view of your company's profitability.

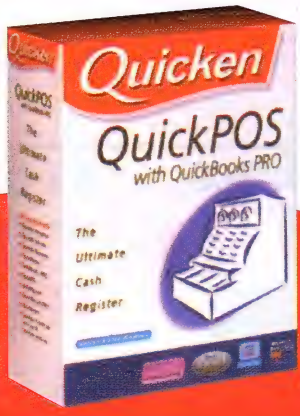
$309 SWQIK001



QuickPOS V2 with QuickBooks Pro

Throw away that old cash register for good! The easiest solution to handle all retail transactions. Developed in Australia to function identically to a standard electronic cash register. Easy for staff to learn and use. Be prepared for GST on 1 July 2000.

$849 SWQIK012



*** Quicken's GST free upgrade Guarantee makes the GST transition as quick and easy as possible.**

We are GST registered supplier of the GST related Goods and Services, through the GST Start up Assistance office

Monitors

***AUSTRALIA WIDE 3 YEAR ON SITE WARRANTY**

MITSUBISHI ELECTRIC

NEW RANGE OF MITSUBISHI MONITORS

Mitsubishi Diamond View 1554i 15"

- 15" Monitor ideal for home users
- Dynamic Focus picture tube
- 13.9" Viewable, 0.28 dot pitch
- Max Resolution 1024 x 768 @65Hz
- Weighs 13kg



***$295** MOMIT009

Mitsubishi Diamond View 1570 15"

- 15" Monitor ideal for SOHOs
- Dynamic Focus picture tube
- 13.9" Viewable, 0.28mm dot pitch
- Max Resolution 1280 x 1024 @60Hz
- Weighs 13kg with OSD



***$350** MOMIT010

Mitsubishi Diamond View 1770e 17"

- 17" Monitor for casual users
- High Contrast CRT
- 15.9" Viewable, 0.27mm dot pitch
- Max Resolution 1280 x 1024 @60Hz
- Weighs 18kg with OSD



***$475** MOMIT012

Mitsubishi Diamond View 1995 19"

- 19" Monitor for professionals
- 18" Viewable, 0.26mm dot pitch
- Max Resolution 1600 x 1200 @75Hz
- Weighs 24kg with OSD
- BNC & 15Pin Input



***$1149** MOMIT005

'the only 19" to equal & better Sony in our tests' APC MAGAZINE APRIL 1999

Editor's Choice apcmag

MITSUBISHI CD-ROM DRIVES



DIAMOND DATA CD-ROM drives are Multi Read Compliant, support Ultra DMA data transfers and employ advanced Constant Angular/Linear Velocity for improved reads and transfers.

Code	Model	Price
MMMIT004	40x EIDE CD-ROM	$79
MMMIT005	50X EIDE CD-ROM	$99

MITSUBISHI DRIVES

Mitsubishi offers the latest innovation in floppy disk drive technology, the LS-120, with 120 megabyte capacity. The LS-120 is also compatible with older 1.44 MB disc.

3.5" 1.44MB Floppy Drive **$30** FDMIT000



Code	Model	Price
BUMIT000	Mitsubishi LS -120	$149
BUMIT001	120MB capacity diskettes	$25

* Terms & Conditions Apply

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3 YEAR ON SITE WARRANTY*

Hitachi CM 610 17" Monitor



- 16" Viewable image
- 0.23mm Horizontal Mask Pitch
- Max Resolution 1280x 1024 @60Hz
- Dimension: 398Wx 418Hx 413Dmm
- Weighs 15.5Kg

$560 MOHIT008

Hitachi CM 650 17" Short-Length



- 16" Viewable image
- 0.21mm Horizontal Mask Pitch
- Max Resolution 1280x 1024 @60Hz
- Dimension: 412Wx 431Hx 373Dmm
- Weighs 17Kg

PRICE DROP

$645 MOHIT001

Hitachi CM 766 19" Monitor



- 18" Viewable image
- 0.21mm Horizontal Mask Pitch
- Max Resolution 1600x 1200 @75Hz
- Dimension: 448Wx 442Hx 447Dmm
- Weighs 22Kg

Editor's Choice apcmag January 2000

$1065 MOHIT002

Hitachi CM 769 19" Professional



- 18" Viewable image
- 0.21mm Horizontal Mask Pitch
- Max Resolution 1800x 1350 @75Hz
- Dimension: 448W x 442Hx 447Dmm
- Weighs 22.5Kg

$1370 MOHIT003

Hitachi CM 811 21" Monitor



- 20" Viewable image
- 0.22mm Horizontal Mask Pitch
- Max Resolution 1600x 1200 @75Hz
- Dimension: 488Wx 482Hx 470Dmm
- Weighs 27.5Kg

$1995 MOHIT004

Hitachi CM 813 21" Performance



- 20" Viewable image
- 0.22mm Horizontal Mask Pitch
- Max Resolution 1856x 1392 @75Hz
- Dimension: 488W x 482Hx 470Dmm
- Weighs 27.5Kg

PRICE DROP

$2180 MOHIT005

Hitachi PCX-DT3 141 14.1" LCD



- Pixel Pitch 0.279mm
- Max Resolution 1024x 768 @75Hz
- Dimension: 375Wx 327Hx 199Dmm
- Weighs 6Kg
- Power Consumption Approx 35W
- Advanced Super TFT LCD
- Panel offers wider viewing angle up to 80° and brighter, Sharper images than CRT's

PRICE DROP

$2095 MOHIT006

Hitachi CML 150x E 15" LCD



- Pixel Pitch 0.279mm
- Max Resolution 1024x 768
- Dimension: 407Wx 372H x 215Dmm
- Weighs 8Kg
- Power Consumption 45W Max

PRICE DROP

$2235 MOHIT007

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Adelong Computers

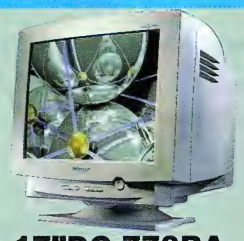
Monitors

Videocom



• 15"DD-556BA
- Screen Size 13.8" Viewable
- Dot Pitch 0.28mm
- Max Resolution 1024x768 N/I
- User Control OSD

$275 MOVID003



• 17"DC-770BA
- Screen Size 16" Viewable
- Dot Pitch 0.27mm
- Max Resolution 1280x1024 N/I
- User Control OSD

$415 MOVID000



• 17"DE-770FA
- Screen Size 16" Viewable
- Dot Pitch 0.25mm
- Max Resolution 1280x1024 N/I
- User Control OSD

$465 MOVID002



• 19" DA-995
- Screen Size 18"Viewable
- Dot Pitch 0.25mm
- Max Resolution 1600 x 1200 N/I
- User Control OSD

$875 MOVID001

3 YEAR ON SITE WARRANTY* *QUEENSLAND, NSW, VICTORIA ONLY

CD-ROM/CD-RW Drives

DELTA

Delta 48x CD-ROM Drive

One of the fastest and most reliable CD-ROM drives on the market. This new range of IDE CD drives from Delta represent the best value for money. Supports reading of CD-R, CD-RW and other media.

$85 MMDEL003





Code	Model	Price
MMDEL000	CD-Rom44x(OEM only)	$75

Delta CD-RW Drive 4x4x20

Looking for the latest CD ReWriting technology at a great price then look no further than the Delta 4x record, 4x rewrite and 20x read IDE CDRW drive. This is the best value kit on the market with all software and hardware needed to start recording straight away. One blank CDR and CDRW included with kit.



$349 MMDEL001

CD-Recording Kit

Want no frills high speed SCSI recording performance then look no further than this bundle. It includes the new 8x record, 20x read internal SCSI drive, a PCI SCSI card and recording software. Panasonic reliability and 8x recording performance but only at a 4x price.



$549 MMPAN007

Drive only

$419 MMPAN008



DELTA CD-R 10 Pack Silver Discs **$19** MDEL002

CD-ROM/CD-RW Drives

Swann

Let Swann cater to all your modem needs.

Whether you use it for gaming, email, working or online transactions we have the modem just for you



Swann Smart 56K

Simplicity and stability are what made this modem win a 'best buy' award against 17 leading-brand modems tested. The Swann Smart 56K External Modem's clever upright design, not only takes up less desk space, but defies heat, the enemy of all modems. Perfect for the family and new computer user and those new to the internet.



Internal	External
$89	$155
FMSWA001	FMSWA000

Swann Smart 56K Global PC Card



Use in 27 Countries

$178 FMSWA002

SwannSmart International 56K modem cards lets you travel virtually anywhere in the world with your notebook or Palm™ personal assistant and never lose touch. In fact all your usual business and personal communication tasks need never be curtailed, just because you're overseas.

Swann Smart USB 4 Port Hub

Run out of USB ports?....Don't worry. Simply connect a Swannsmart hub and connect up to 4 more USB devices. This little unit require no external power source yet it can produce extra power for your devices via it's unique powerup switch.



$45 DSSWA000

Swann SmartCam Personal

NEW



Want an easy to use USB camera for use on the internet, this is the perfect camera for you. Using the latest CMOS image sensor, this camera is such good value for money. Capable of resolutions up to 352x288 at 30fps. This unit comes complete with SmartCam Works Software.

$95 IOSWA000

Swann SmartCam Deluxe

NEW



Want a USB camera with more performance then this SmartCam Deluxe is just what you need. It features 300K pixel resolution which can handle a 24bit 640x480 images. All this performance at the price of a budget unit. It comes with SmartCam Works as well as Kai SuperGoo.

$155 IOSWA001

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NetComm® Banksia US Robotics® Modems

Adelon Computers

Netcomm Roadster II Ultra 56K

Great for gamer's as well as the business user, this modem features V90 as well as K56 flex protocols. Comes in either the new advanced USB interface or the traditional serial interface.



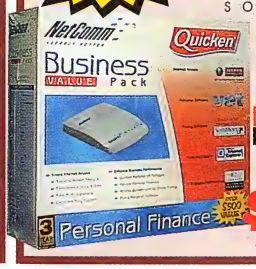
USB **$225** FMNET015

Serial **$225** FMNET012

INCLUDES WINFAX PRO 8.0

Netcomm Business Pack

OVER $500 Value



Quicken

SMITH MICRO SOFTWARE

vet

OZEMAIL INTERNET

The Business Value Pack is a complete personal business package. **The pack includes:**

- Netcomm Simplicity Dual V.90 K56Flex Fax/Modem
- Simultaneous Voice and Data (SVD) over 1 phone line
- Quicken Personal Finance to manage all your finances and access to Quicken.com.au
- Vet Anti-virus to safeguard your PC from viruses
- Quicklink, a renowned business communication software system for fax scheduling
- 100 Hours of Free Internet Access with Ozemail (conditions apply)
- 3 Year Warranty with registration

$210 FMNET019

Banksia EasiHub56

The EasiHub USB allows you to add an additional three ports to your single host port and simultaneously surf the net via its built-in 56k modem.

- V.90 & K56Flex Supported
- Connect an additional 3 USB devices
- Power Pack included for optimal performance
- Power and port activity LEDs



NEW

$189 FMBAN007

3Com 56K Message Modem Pro

Experience office quality full duplex hands free speakerphone with this modem, even feature Caller ID too. You can even store voice/fax messages when you PC is switched off.



Dual V.90 and X2



$275 FMROB012

MICROTEK Scanners

ScanMaker X6

NEW

Incorporating Zero Reflection Technology, the X6 delivers clear, true to life colours.
Features a 8.5" by 11.6" scan area with a transparency option for 6" x 8" transparencies.

PC@uthoity Jan 1999

Macworld Aust Macworld, December 1999

- 1200 x 600 dpi optical resolution
- 9600 dpi interpolated resolution
- 36-bit colour processing
- Software bundle including ScanWizard



$369 IOMIC000

ScanMaker V6USL

NEW

Built on a quality metal frame, this scanner is one of the rare scanners to still use CCD sensors rather than the much cheaper CIS technology. Building on the award winning success of the X6, this scanner can connect via SCSI or USB and comes bundled with a large range of quality software.

- 1200 x 600 dpi optical resolution
- SCSI and USB interface
- 36-bit colour processing (1 pass)
- Software Bundle



$399 IOMIC002

ScanMaker® X12USL™

NEW

Legal size scanner featuring both USB and SCSI connections

The Microtek ScanMaker X12USL scanner offers 2400 x 1200 dpi optical resolution. This allows for faster scan speed, better colour accuracy greater ease of use compared to entry level scanners. A better scanner means you don't waste your time correcting ever scan. Comes complete with ScanWizard 5 software, this scanner can connect via SCSI or USB.

- 2400 x 1200 dpi optical resolution
- SCSI and USB interface
- 42-bit colour processing (1 pass)
- Software Bundle



$579 IOMIC003

Software bundle includes:

ScanWizard - integrates seamlessly with most software packages supporting TWAIN. Includes a "de-screening" feature which removes the crisscross patterns on printed materials such as magazines.

Scansuite **PhotoImpact V4** **ColorIT (MAC)** **Omnipage LE OCR**

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HEWLETT PACKARD

OfficeJet

Office Laser
NEW
LaserJet 3150

- The HP LaserJet 3150 is a versatile business tool that delivers convenient printing, faxing, copying and scanning capabilities in a single laser device, and enables you to communicate more effectively with customers and clients.
- 6ppm Black Laser
- 600 x 600 DPI
- 100 sheet paper tray



$1489 PRHPD034

Economy
OfficeJet 635

- The HP OfficeJet 635 is a colour printer, colour copier, colour scanner and plain paper fax. This is the best value All-in-One product that makes it easy to complete your work.
- 5ppm Black/ 2ppm Colour
- 600 x 600 DPI Photo REt
- 150 sheet paper tray



$585 PRHPD033

Colour Faxing
OfficeJet 725

- The HP OfficeJet Series 700 prints, faxes, scans and copies all in color. That's right-it even sends and receives color faxes with other color fax machines. You can even scan and send color documents to anyone with an email address.
- 5ppm Black/ 2ppm Colour
- 600 x 600 DPI Photo REt
- 150 sheet paper tray



$665 PRHPD055

OfficeJet

Flatbed
HP OfficeJet R45

- The reliable HP OfficeJet R45 fits right into the busiest home office or small business. It provides printing, scanning, and copying, all in colour, and all in one easy-to-use product. That saves space, reduces clutter, and simplifies set-up.
- 11ppm Black/ 8.5ppm Colour
- 600 x 600 DPI Printing
- 600 x 2400 DPI 30 bit Flatbed Scanning
- 100 sheet paper tray



$945 PRHPD058

HP OfficeJet R65

- 30 page automatic document feeder

$1135 PRHPD059

All in One
OfficeJet T Series

- The latest Deskjet technology is used in the new HP T series OfficeJet. You get stand alone fax capabilities as wells as scan, copy and print functions. All of this using HP's PhotoRet II, which means that image quality is excellent and print speed is faster than ever. All T series come with OCR and imaging software.

T65
- 11ppm Black / 8.5ppm Colour
- 600 x 600DPI PhotoREt II
- 10 Speed dials

$965 PRHPD065

T45
- 9ppm Black / 6.5ppm Colour
- 600 x 600DPI PhotoREt II

$865 PRHPD064



Printers

SAMSUNG

SAMSUNG LASER PRINTERS Challenge the Limits of business Performance!

Office Laser Printer
ML-5200A

- Fast 10PPM Printing Speed
- True 600 x 600 DPI Outstanding Resolution
- HP®PCL®5e Compatible Emulation
- USB and Parallel
- One-piece Integrated Toner & OPC imagery of 6000 Pages at 5% Coverage
- Easy to Use-Easy installation

$699 PRSAM006



Business Laser Printer
ML-6050

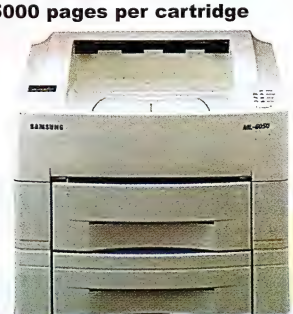
- Fast 12PPM Printing Speed
- True 600 x 600 DPI Outstanding Resolution
- HP®PCL6® Compatible Emulation
- Various 45 scalable Fonts
- One-piece Integrated Toner & OPC imagery of 5000 Pages at 5% Coverage
- Easy to Use-Easy installation

$899 PRSAM001

Printer Toner Cartridge for ML-6050

$199 INSAM004

5000 pages per cartridge



SECOND TRAY FEEDER IS AN OPTIONAL EXTRA

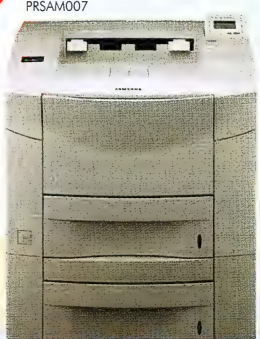
Workgroup Laser Printer
ML-7050

- Fast 17PPM Printing Speed
- Superior Printer Performance
- 100Mhz RISC Processor
- First Page Printing Time of Under 13 Seconds
- HP®PCL6® Compatible Emulation
- Standard Postscript Level II
- Optional 10/100 Ethernet Card for Robust Network Connectivities
- Standard Duplex Printing Function

$1699 PRSAM007

Printer Toner Cartridge for ML-7000/50

$299 INSAM005



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A4 Colour Inkjet

Value
Stylus Colour 460
- A Windows only printer, the EPSON STYLUS COLOR 460 is ideal for first time users, students and families experimenting with colour.
- 4ppm Black/2.5ppm Colour
- 720 x 720 DPI



$225
PREPS028

Home User
Stylus Colour 660
- Perfect Photo Quality printer for desktop publishing at home. It features true 1440 x 720 dpi resolution.
- 5ppm Black/3.5ppm Colour
- 1440 X 720DPI



$305
PREPS029

SOHO
Stylus Colour 760
- Delivers a precisely controlled ink droplets - the result is greater detail and smoother halftones. It's PC and Mac. compatible and offers USB connectivity.
- 7ppm Black/6.8ppm Colour
- 1440 X 720DPI



$510
PREPS030

Specialist Printers

Professional
Stylus Colour 860
- The EPSON STYLUS COLOR 860 is a revolutionary new printer targeted at business and professional graphics users wanting maximum colour output combined with speed and affordability.
- 9.5ppm Black/9.3ppm Colour
- 1440 x 720 DPI



$590
PREPS031

Office Colour
Stylus Colour 900
- It also offers flexible connectivity, Serial, USB, Parallel and optional ethernet.The combination of printing technologies ensure it is a high-speed, high-image quality printer.
- 12ppm Black/11.7ppm Colour
- 1440 X 720DPI



$775
PREPS024

Over Size Colour
Stylus Colour 1160
- The new EPSON STYLUS COLOR 1160 is a revolutionary printer targeted at business and professional graphics users wanting maximum colour output combined with speed and affordability and the versatility of printing larger than A3. USB and Parallel interfaces.
- 9.5ppm Black/9.2ppm Colour
- 1440 x 720 DPI

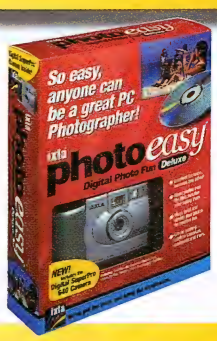


$870
PREPS032

ixla Digital Cameras

ixla photoeasy Deluxe

With the new Digital SuperPro 640 camera and ILXA's award winning PC Photography software, getting started with digital photography couldn't be easier. IXLA Photoeasy Deluxe is the PC photography tool that you have been waiting for....a digital camera, with built in flash, that takes great looking pictures, accompanied with easy to use PC photography software; all for an incredible low price.



NEW

- True 640x480 resolution
- USB and Serial connection
- 30 photos storage
- Built in Flash
- No Film required
- No Developing costs!



$199 IOIXL000

AGFA Digital Cameras

The best in imaging products at amazing prices. If you need excellent value or uncompromised image quality, Agfa Digital Cameras are the way to go.

ePhoto CL30
The compact design and simply operation of the ePhoto CL30 are ideal for both business and leisure applications. Images of 1440 x 1080 pixels, enhanced by unique PhotoGenie technology, make perfect photo quality prints.



USB UNIVERSAL SERIAL BUS

$750 IOAGF003

ePhoto CL50
The top quality ePhoto CL50 compact digital camera doesn't only produce great photos, it registers panoramas, animated clips and even your voice! Four capture modes plus burst mode. In 1600 x 1200 mode, there's ample detail for photo quality prints (8" x 10")



$1450 IOAGF004

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Hot Products

Photoreproduction

PhotoSmart P1000 / P1100

- HP's Photosmart range can be connected to a PC as a photoquality printer or print directly from HP memory cards. No PC no hassles. You just won't believe the quality of PhotoRet 3 printing, you must see it to believe it.
- 11ppm Black / 8.5ppm Colour (P1000)
- 12ppm Black / 10ppm Colour (P1100)
- 2400 x 1200 DPI PhotoREt 3



P1000
$765 PRHPD066

P1100
$960 PRHPD067

Oversized Printing

DeskJet 1220C

- This printer is part of HP's professional series printer. It is the most advanced wide format printer in the lineup. Featuring the new Photo Ret3 Colour Layering Technology, straight paper path (up to 250gsm), instant print cancel button, paper handling ability from postcards through to A3 paper. One of the most versatile printers in the world, the 1220C can connect via USB and parallel interfaces.
- 11ppm Black / 9.5ppm Colour
- 2400 x 1200 DPI
- Photo REt 3

$989 PRHPD070



NEW

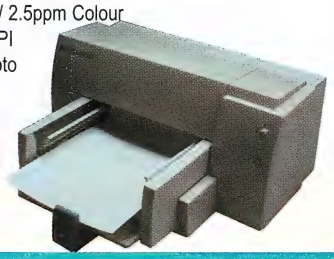
DeskJet

Economy

Deskjet 610C

- Inexpensive and easy to use, the HP DeskJet 610C printer produces affordable, high-quality colour and black printing for all your home and school needs.
- 5ppm Black / 2.5ppm Colour
- 600 x 600 DPI
- Optional Photo printing

$220 PRHPD061



Value

DeskJet 810C

- Produce projects with photo-quality images and crisp black text for school and home easily, quickly and creatively with the new HP DeskJet 810C printer.
- 6.5ppm Black / 4.5ppm Colour
- 600 x 600 DPI Photo REt II

$310 PRHPD056



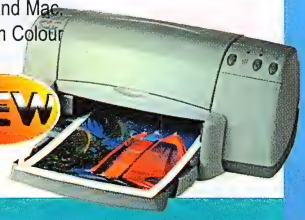
SOHO

DeskJet 930C

- Compact performer, this is the printer to get if you need top notch performance but don't have the space for it. With innovative features like the fold up paper tray and print cancel button, this printer is both easy to use and setup. Utilising parallel and USB interfaces, this printer is compatible with PC and Mac.
- 9ppm Black / 7.5ppm Colour
- 2400 x 1200 DPI
- Photo REt 3

$429 PRHPD068

NEW



Office

Professional

DeskJet 950C

NEW

- Featuring the new photopaper tray, [illegible] photos or normal documents without ever leaving your chair. Simply select the tray you wish to use with a few mouse click and your photoquality print will be done in seconds. Connect it via USB or parallel interfaces.
- 11ppm Black / 8.5ppm Colour
- 2400 x 1200 DPI
- Photo REt 3

$585 PRHPD069



Professional Office Printer

Deskjet 970Cxi

- The premier photo-quality printer for busy professionals who take their image very seriously. Featuring stunning photo-quality with PhotoREt 3, and laser like text at up to 12ppm. Innovations like automatic two sided printing, USB connection and extra large 150 sheet paper tray are exclusive to the 970Cxi.
- 12ppm Black / 10ppm Colour
- 2400 x 1200 DPI PhotoREt 3

$775 PRHPD063



Laser Quality

LaserJet 1100

- You need the convenience and privacy of a personal printer.. With the HP LaserJet 1100 printer, you can put fast, personal laser printing for business right on your desk.
- 8ppm Black Laser
- 600 x 600 DPI
- 120 sheet paper tray
- Optional Scanner attachment

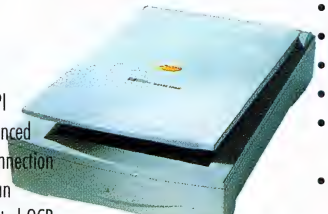
$785 PRHPD041



ScanJet 3200C

This affordable scanner features HP's exclusive Intelligent Scanning Technology to optimize photos, drawings and text automatically. And, you can pair it with your color printer to make color copies. Here's a versatile scanner for the entire family!

- 30bit internal
- 600 x 1200 DPI
- 9600 DPI enhanced
- Parallel port connection
- HP PrecisionScan LT with automated OCR



$179 IOHPD020

ScanJet 3300C

For easy scanning and copying, try the HP Scanjet 3300C. Setup is a breeze with the USB interface and Windows 98. Just plug it in. You can scan or copy at the touch of a button.

- 36bit internal
- 600 x 1200 DPI
- 9600 DPI enhanced
- Windows 98 USB
- HP PrecisionScan LT with automated OCR
- Push button Scan and Copy



$239 IOHPD027

ScanJet 5300C

The HP ScanJet 5300C color scanner delivers quality results up to three times faster than other scanners. One button starts any project! The HP ScanJet 5300C offers hassle-free connectivity through the parallel port, or Universal Serial Bus (USB).

- 36bit internal
- 600 x 1200 DPI
- 9600 DPI enhanced
- USB and Parallel port connection
- HP PrecisionScan 2.0 with automated OCR

NEW



$579 IOHPD029

BubbleJet

Value
BJC-265SP
- Unbelievable value with this versatile bubblejet printer. For even greater versatility, the BJC-265SP offers the option of PhotoRealism inks. The PhotoRealism inks for photorealistic prints at a low price.
- 3.4ppm Black / 0.5ppm Colour
- 720 x 360 DPI

$135
PRCAN026



Home User
BJC-2000SP
- The user-friendly BJC-2000SP features dual ink tank for true blacks. Meet the one-stop solution for all your home-office printing needs. The optional colour scan head can be used for colour scans, OCR and faxing. Windows®95 or 98 only.
- 5ppm Black / 2ppm Colour
- 720 x 360 DPI Resolution

$175
PRCAN029



Economy
BJC-3000
- Want photoquality colour and laser quality text, this versatile printer is breaking price barriers. Capable of 1440 dpi, it features separate ink tanks and easy to use USB connection as well as parrallel.
- 9ppm Black / 4ppm Colour
- 1440 x 720 DPI

$260
PRCAN034

NEW



Over-Size
BJC-5100
- Snap in a second black cartridge for double the print speed or snap in the colour cartridge for photo realistic colour printing. They don't come any more versatile. Print up to A3.
- 10ppm Black / 4ppm Colour
- 1440 x 720 DPI

NEW

$350
PRCAN031



SOHO
BJC-6000
- Presenting the ultimate in Speed, Quality, and Cost-Effectiveness. The new standard in colour printing from Canon. Using 6 colour printing and drop modulation technology, the BJC-6000 produces photorealistic images.
- Separate ink tanks for each colour
- 8ppm Black / 5ppm Colour
- 1440 x 720 DPI

$350
PRCAN028



Professional
BJC-7100
- Need to print high quality colour images at high speed, then the 7 colour photo realism system in the Canon BJC-7100 will be the perfect choice. Capable of photorealistic printing on plain paper, this high speed bubblejet is perfect for the demanding graphics user.
- 8ppm / 5ppm Colour
- 1200 x 600 DPI

$499
PRCANS025



Refer to o website fo great rang of Printe Cartridge

Wide Format
BJC-5500
- For all oversize printing needs, this is the printer for you. It handles cut sheets up to A2 and also feature an in built tractor feeder. All this in either high speed black or full photo colour.
- 7ppm Black / 2.5ppm Colour
- 1440 x 720 DPI

$1245
PRCAN013



Compact
BJC-80
- Portable printing solution with all the features of a desktop printer. Drop modulation technology and features that are exclusive to the portable environment like IRDA. Best of all it is only 1.4Kg and fits in half a briefcase.
- AC/ Battery Powered
- 4.5ppm / 1ppm Colour
- 720 x 360 DPI

$335
PRCAN000



Instant Scan Capabilities — IS-12 Scanner head **$135** PRCAN001

Desk Laser
LBP-800
- Compact desktop 8ppm laser printer with face up or down paper delivery, 125 page Multipurpose Tray and single sheet Manual Feed Slot. Comprehensive job control via Canon Advanced Printing Technology driver software including Match Paper Size, Multipage per Sheet , collate, Form Overlay, Customer Paper Size, Toner Saver and Automatic Image Refinement modes.
- 8ppm
- 600 x 600 DPI

$555
PRCAN030

NEW



PRCAN018 LaserBeam LBP1760 **$1735**

Scanners

Value
FB-330P
Parallel Interface
- Parallel
- A4 36-bit Scanner
- 300 x 600 DPI Optical Resolution
- Includes Canon Software Bundle

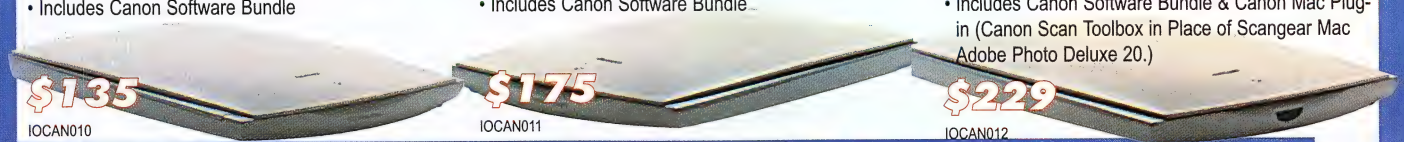
$135
IOCAN010

SOHO
FB-630P
600 x 1200 DPI
- Parallel
- A4 36-bit Colour Scanner
- 600 x 1200 DPI Optical Resolution
- Includes Canon Software Bundle

$175
IOCAN011

USB
FB-630U
NEW
- USB A4 36-bit Colour Scanner
- 600 x 1200 DPI Optical Resolution
- Windows 98, iMac & Mac G3 Compatible
- Includes Canon Software Bundle & Canon Mac Plug-in (Canon Scan Toolbox in Place of Scangear Mac Adobe Photo Deluxe 20.)

$229
IOCAN012



Sales Staff are Available (est) 9am-6pm Monday to Friday, 10am-4pm Saturday

Technical Support (5 Days a week 9am-6pm) Phone (02) 8344 3160

Sales Hotline 02 8344 3190

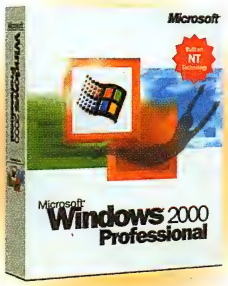
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Easy to Order, Email: sales@adelong.com.au

Microsoft Windows 2000 Professional

Windows 2000 is a powerful, reliable platform for 7 x 24 computing. The Combined Best Business Features of Windows 98 and Windows NT operating systems.







Built on NT Technology and an easy-to-use, familiar Windows® 98 user-interface, Windows 2000 Professional makes business users more productive. Its integrated Web capabilities and broad support for mobile computers and hardware devices makes Windows 2000 the easy way for business users to connect to the Internet anywhere and anytime. And its rock-solid reliability and improved manageability simplify desktop management for IT professionals.

- Greater Reliability
- Enhanced Security
- Better Performance

SWMST088	Windows 2000 Professional	$465
SWMST089	Windows 2000 Professional Prior (for win98 users) Upgrade	$325
SWMST090	Windows 2000 Professional (for NT users) Upgrade	$219
SWMST091	Windows 2000 Professional Server 5 Client	$1510
SWMST092	Windows 2000 Professional Server 5 Client Upgrade	$739

Microsoft Office 2000

Office 2000 is finally here!

With six complete Office 2000 applications you will find office tasks easier. Microsoft offers you four unique packages to choose from: Microsoft office 2000 Standard, Microsoft office 2000 Premium, Microsoft office 2000 Developer and Microsoft office 2000 Small Business.



Microsoft Office 2000

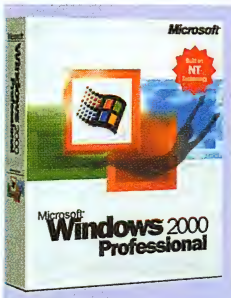
SWMST078 **$865**

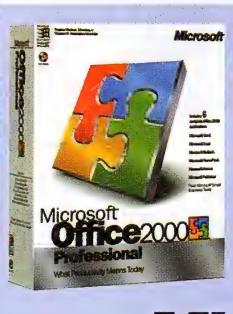
Microsoft Office 2000 Professional includes; Microsoft Word, Microsoft Excel, Microsoft Outlook, Microsoft PowerPoint, Microsoft Access, Microsoft Publisher.

PLUS

Microsoft Small Business Tools.

If you have any questions, simply call our friendly sales team on 02 8344 3190.







Microsoft

Microsoft

Item Code	Description	Price
SWMST087	MS FrontPage 2000	$185
SWMST083	MS FrontPage 2000 UPG	$85
SWMST069	MS Windows98 2nd Edition UPG	$139
SWMST070	MS Windows98 2nd Edition NEW	$279

Item Code	Description	Price
SWMST076	MS Office 2000 STD	$715
SWMST077	MS Office 2000 STD UPG	$415
SWMST078	MS Office 2000 PRO	$865
SWMST079	MS Office 2000 PRO UPG	$495
SWMST080	MS Office 2000 SBE	$715
SWMST081	MS Office 2000 Premium	$1159
SWMST082	MS Office 2000 Premium UPG	$595

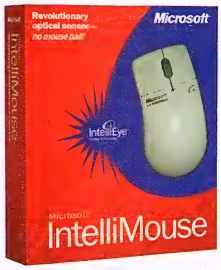
Microsoft IntelliMouse Explorer



Point and click with pinpoint accuracy-literally! The new IntelliMouse Explorer from Microsoft is so advanced, it doesn't need a mechanical ball as its been replaced with the new IntelliEye optical sensor, which provides consistent accuracy and control on virtually any surface.
- Features 2 additional, customizable buttons
- Includes the IntelliMouse scrolling wheel

$89 IOMST012

Microsoft IntelliMouse IntelliEye



The IntelliMouse with IntelliEye gives you superior precision with its revolutionary optical sensor that scans your desktop 1,500 times a second. It works on virtually any surface-so no mouse pad or roller-ball cleaning is required. The IntelliMouse with IntelliEye also features an ergonomic design and a wheel for efficient zooming and scrolling.

$75 IOMST013

Microsoft Natural Keyboard Pro



The new ergonomic Microsoft® Natural® Keyboard Pro features 19 "Hot Keys," which link directly to applications on your PC and the web. Plug in up to 2 USB devices directly into your keyboard.

$109 IOMST014

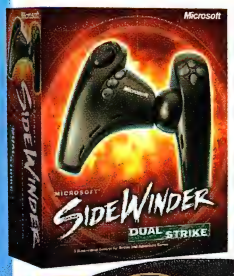
Microsoft Internet Keyboard



Includes 10 hot keys on a comfortable design that also features a detachable palmrest for added comfort. Hot Keys allow instant access to email and internet functions.

$49 IOMST015

Microsoft SideWinder Dual Strike



Dual Strike integrates the directional control of a keyboard, the precision of a mouse, the fun and excitement of a joystick, and the comfort of a game pad-all in one single and versatile handheld unit. Dual Strike device controls functions like running, dodging, side-stepping as well as aiming, navigation, and coordinating difficult moves like strafing and circle strafing. USB Port required

$89 IOMST016

Microsoft Precision Racing Wheel



The Precision Racing Wheel includes a compact, yet rugged, state-of-the-art PC steering wheel, an easy-to-release clamp, and sturdy, non-slip pedals. The Precision Racing Wheel also features 8 buttons, including 2 shifters/triggers, which you can program and customize for your own driving preference

$149 IOMST017

Networking

Symphony by proxim

Connect your computers together without wires! Eliminate the hassle of opening up walls, climbing through your attic or stringing cables across the floor. This amazing radio data technology will allow you to network computers either for the office or home. Networking will allow you to share printers, transfer files, share an internet connection, so more that one person can use the internet at anyone time. It will even allow you to play multiplayer games like never before. Whether you have a desktop or laptop, with Proxim Symphony, networking is as simple plugging it in and turning it on.





- 1.6Mbps Radio Data Rate
- 150 foot range through walls, ceiling and floors
- Cordless networking

NWPRO000	Cordless ISA Card	$290
NWPRO001	Cordless PCI Card	$290
NWPRO002	Cordless PC Card	$345
NWPRO004	Cordless Ethernet Bridge	$935

Sales Staff are Available (est)
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DES-1005D 5 Port Switch

The DES-1005D is an unmanaged 10/100Mbps switch designed to enhance small workgroup performance while providing a high level of flexibility.Powerful yet easy to use, this device allows users to simply plug any port to either a 10Mbps or 100Mbps network to multiply bandwidths, boost response time and satisfy heavy load demands.

Features,

- 5x 10/100Mbps ports
- MDI uplink port for easy expansion
- All ports support full/half-duplex
- Flow control for protection against data loss
- Dynamic buffer allocation for each port
- Auto-learning of network configuration
- Secure store-and-forward switching scheme
- Auto-correction of reverse twisted-pair polarity
- Compact palm-sized

NEW



$175 NWDLI048

Switches

Code	Model	Ports	10Mbps	100Mbps	1000Mbps	Price
NWDLI022	DES-1008	8	✔	✔		$610
NWDLI032	DES-1016	16	✔	✔		$1215
NWDLI035	DES-1024	24	✔	✔		$1745
NWDLI051	DES-3225G	24	✔	✔	✔	$2995

DMF-560TXD 10/100Mbps PCMCIA Card

The D-Link DMF-560TXD is a Direct Port 10/100Mb Dual Speed Ethernet PC Card with an integrated V.90/K56flex Data/Fax Modem.
It allows PC or Power MAC laptop users to seamlessly connect to both Ethernet and Fast Ethernet LANs. The D-Link DMF-560TXD also allows users to send and receive faxes, connect to the Internet, and dial into a Remote Access Server or PC using this one PCMCIA PC Card.



DONGLE FREE

$395 NWDLI044

PCMCIA Fax/Ethernet Cards and Fax/Modems

Code	Model	Description	Price
NWDLI003	DE-660CT	10Mbps PCMCIA Ethernet Card	$105
NWDLI043	DFE-660TX	10/100Mbps Cardbus PC Card	$145
FMDLI001	DFM-560E	56K V.90 & Flex External Fax/Modem	$129
FMDLI000	DFM-560I	56K V.90 & Internal Fax/Modem	$85

Ethernet and Fast Ethernet Adaptors

Code	Model	Bus	Speed	Price
NWDLI000	DE-220PCT	ISA	10Mbps	$35
NWDLI001	DE-528CT	PCI	10Mbps	$39
NWDLI002	DFE-530TX	PCI	10/100Mbps	$55

DP-692 9 Port Hub + Internet Server

The DP-692 streamlines your network by combining a 9 port Hub and Internet Server. It allows user on the network to connect to the Internet using only one ISP account.

Features,

- 2 Port Internet Server with a built in 9 port Hub + Uplink.
- Dial on demand, web browser and telenet.
- 9x10Mbs RH 45 Ethernet Port,1XCombo BNC &RJ45.
- 2x Serial Ports



$525 NWDLI047

Internet Servers

Code	Model	Ports	Network Port	Price
NWDLI024	DP-602	2x Serial Port	10/100Mbps	$485
NWDLI046	DP-601M	1x 56K V.90 Modem Port	10/100Mbps	$525
NWDLI053	DI-510	Internet WAN Server/ Remote Acess	1x 10baseT Port	$418

Print Server

Code	Model	Ports	Network Port	Price
NWDLI015	DP-300	2x Parallel, 1 x Serial	10/100Mbps	$435



DU-H4 4 Port USB Hub

These USB Hubs allow you to connect up to 4 USB peripherals for use with a single PC.

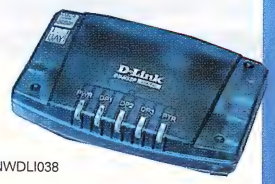
$75 NWDLI037

DU-H3SP 3 Port USB

with 1 x Serial, 1 x Parallel

Multipurpose device allows connection of up to 3 USB peripherals, 1 serial device and 1 parallel port device such as a printers and modems.

$169 NWDLI038





DU-E10 x Port USB

1 USB Port, 1 10Base-T port

This adapter is the fastest and easiest way to connect desktop, laptops and notebooks to 10Mbps Ethernet network. All users have to do is plug in the adapter to the PC's USB port to connect to the network.

$87 NWDLI049

Hubs

Code	Model	Ports (RJ45)	Speed	Price
NWDLI017	DE-805TP	5	10Mbps	$89
NWDLI004	DE-809TC	8	10Mbps	$105
NWDLI042	DE-816TP	16	10Mbps	$279

Dual Speed Hubs

Code	Model	Ports (RJ45)	Speed	Price
NWDLI045	DFE-905DX	5	10/100Mbps	$240
NWDLI012	DFE-908DX	8	10/100Mbps	$355
NWDLI014	DFE-916DX	16	10/100Mbps	$695
NWDLI020	DFE-2624X	24	10/100Mbps	$1325

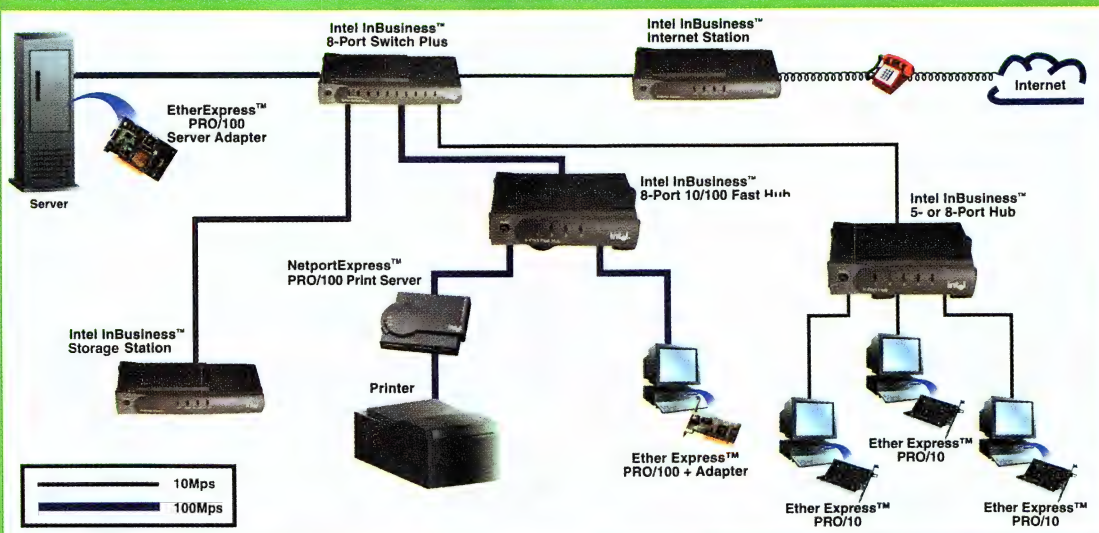
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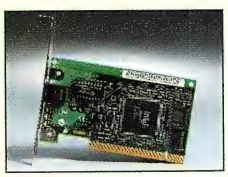
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Fax: (02) 9267 5042

intel® InBusiness™ Small Business Networking Products



Ethernet PCI Adapters

For customers who want basic, high speed connectivity, the Intel® PRO/100+ provides peak performance and Adaptive Technology to optimise network performance. 10/100M auto-negotiation automatically connects at the highest speed for maximum performance.



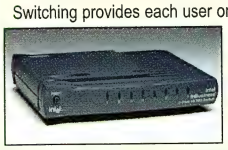
Server Adaptor
$199
NWINT016

Management Adaptor
$159
NWINT015

InBusiness™ Switch

The Intel® InBusiness™ 10/100 Switch is perfect for improving the performance of your network using standard or Fast Ethernet. Designed to give users high-speed performance at an affordable price.

- Plug & Play installation
- Auto sensing ports automatically detect speed of connected device. Switching provides each user or hub a direct channel to network devices



4 Port
$330
NWINT019

8 Port
$495
NWINT014

InBusiness™ Hubs

Intel® InBusiness™ Hubs are designed so you can easily create your own small network or expand an existing network in minutes. Designed to be small enough for the desktop, they are the perfect solution for sharing devices and other resources.

- Simply Plug & Play Installation
- Crossover port allows you to connect to other Hubs
- Choice to 10 or 100Mbps RJ-45 Ethernet Connectivity



Code	Model	Speed	Price
NWINT008	5-port	10Mbps	$95
NWINT009	8-port	10Mbps	$125
NWINT010	4-port	100Mbps	$210
NWINT011	8-port	100Mbps	$379
NWINT012	8-port	10/100 Auto	$415

InBusiness™ Print Station

The Intel® InBusiness™ Print Station is the easy way to share printers over a network. Set-up is so simple that within minutes your small business can be printing to shared printers over a 10 or 100Mbps network. Now you can locate up to 2 printers anywhere on your network independent of PCs with a single Print Station.

- 10 or 100Mbps Ethernet Connection
- Supports 2 Parallel Printers
- No configuration hassles with simple installation wizard



$335
NWINT007

InBusiness™ Internet Station 56K

The Intel® InBusiness™ Internet Station 56K is the ideal way to connect your small office to the Internet. Cost-effectively share one analog phone line, and one Internet account over the network. Easily combine multiple analog connections and line to increase your Internet access speed up to two times current analog speed. The Intel InBusiness Station 56K is part of a complete line of networking products designed specifically for small business.

- 2 x RJ-11 Phone Ports, 9-Pin Serial Port
- 4 x 10Base-T Ethernet Ports
- Supports TCP/IP, DNS, DHCP, CHAP, HTTP
- Built in 56K Modem
- Includes brower based setup software



$575
NWINT018

InBusiness™ Storage Station

The InBusiness™ Storage Station lets your office share files over the network, and includes PC backup software for data protection. Simple installation and setup make it the easiest way to provide shared storage for your employees by simply dragging and dropping files on a central drive.

- 10 or 100Mbps Ethernet Connector
- Supports TCP, DHCP, FTP, HTTP, SMB
- Includes Client installer CD software



12GB
$1895
NWINT004

24GB
$2645
NWINT005

Easy to Order, Email: Sales@adelong.com.au

Adelong Computers

Data Switches/Video Switches

Never again will you need multiply monitors, keyboards and pointing devices with the range of CPU Switching devices. A single keyboard, mouse and monitor can control up to 8 computers simultaneously without any cable changes. These CPU Switches are digital and require only the push of a button. Excellent for network administrators or anyone who wishes to control 2 or more computers hassle free!

Features:

- Supports Mouse/KB emulation for automatic bootup
- Supports VGA, SVGA & Multisync monitors
- LED's give current status
- Easy to install & use

Master View Plus

- Mirosoft Intellimouse, Logitech First Mouse, Mouse Man+...Support
- Mouse Conversion - PS/2 Mouse Controls All Connected PCs
- PS/2 Style Keyboards Controls All PCs
- Superior Video Quality - Up To 1920 x 1440
- Cascadable To Three Levels
- LED Display For Easy Status Monitoring
- Rack Mountable
- Microphone and Speaker Support CS-1008, and CS-1016

EXCELLENT FOR MULTIMEDIA

- CS-138

Control up to 8 PCs with the CS-138. Features:

- VGA Bandwidth of 180Mhz
- VGA Resolution of 1600x1200 @60Hz



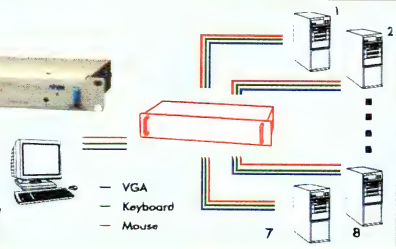
DSADE041 **$755**

Rack mountable PS2 interface

- CS-1008 Audio Support



- Up to 8 PC Systems per Switch
- Connect up to 256 PC Systems
- 180Mhz VGA Bandwidth

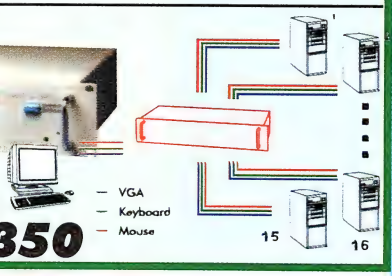


DSADE045 **$795**

- CS-1016 Audio Support



- Up to 16 PC Systems per Switch
- Connect up to 512 PC Systems
- 180Mhz VGA Bandwidth



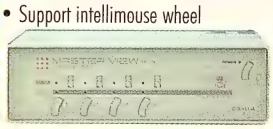
DSADE046 **$1350**

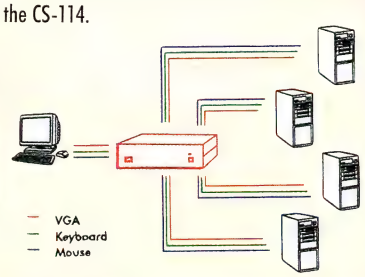
Master View Plus

- PS/2 style or AT style keyboard and mouse connector.
- Microsoft Intellimouse, Logitech First Mouse+, Mouse Man+
- Mouse Conversion - PS/2 Mouse Controls All Connection PCs
- Cascadable To three Levels

- CS-114 Control up to 4 PCs with the CS-114.

- VGA Bandwidth of 100Mhz
- VGA Resolution of 1024x768 @80Hz
- Support intellimouse wheel



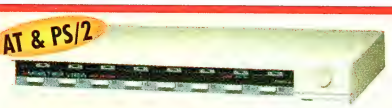


DSADE038 **$375**

- CS-128

AT & PS/2

- 8 Port Switch Box



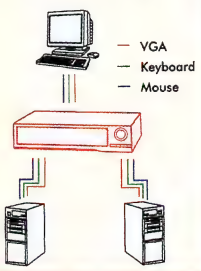
DSADE036 **$695**

Item Code	Description	Price
CBGEN127	AT CABLE SET for CS-128	$39
CBGEN128	PS/2 CABLE SET FOR CS-128	$39

- CS-122 Switch between 2 PCs. Features:

- VGA Bandwidth of 180Hz
- VGA resolution of 1600x1200 @60Hz





DSADE037 **$275**

CPU SWITCH CABLE SET

each cable set connects to one computer.

Code	Model	Price
CBGEN098	3M AT Cable Set CS/122/114	$39
CBGEN099	3M PS/2 Cable Set CS/122/114/138	$39
CBGEN127	3M AT Cable Set CS128	$39
CBGEN128	3M PS/2 Cable Set CS128	$39

Code	Model	Price
CBGEN163	1.8M AT Cable Set CS122/114	$35
CBGEN164	1.8M PS/2 Cable Set CS122/114/138	$35
CBGEN166	10M PS/2 Console Extension M/F	$69
CBGEN168	3M PS/2 Cable Set CS 1008/1016 Audio	$39

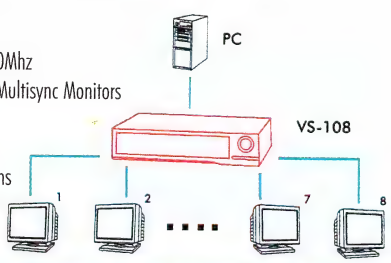
Code	Model	Price
CBGEN169	3M AT Cable Set CS1008/1016 Audio	$39
CBGEN170	5M PS/2 Cable Set CS1008/1016 Audio	$59
CBGEN171	5M AT Cable Set CS1008/1016 Audio	$52

VIDEO SPITTERS

can duplicate PC video signals and amplify them for transmission to multiple monitors. These splitters are capable of supporting high band widths, which can easily accommodate the latest resolution technology. An excellent choice for presentations or broadcasting demos or special events.

Specifications:

- Supports Bandwidths to 350Mhz
- Supports VGA, SVGA, XGA, Multisync Monitors
- Max. Cable to 65 Meters
- Excellent for high quality multimedia and presentations



VS-132

2 Port Video Splitter
1920 x 1400@80Hz

$99 DSADE048



VS-104

SPECIAL

4 Port Video Splitter
1600 x 1200@70Hz

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VS-108

8 Port Video Splitter
1600 x 1200@60Hz

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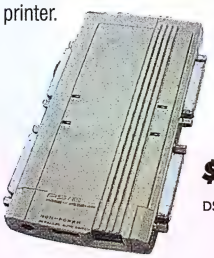
TRANSECEIVER / PARALLEL SWITCHS

Ethernet Transceiver
Connects AUI-IS to Ethernet 10 Base 5, 10 Base T. (RJ45)



$55 NWGEN011

PARALLEL Auto Switch AS45IP
Connects up to 4 computers to 1 printer.

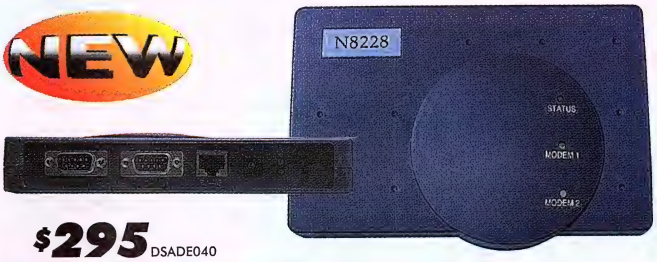


$25 DSGEN007

IP SHARING DEVICE

Wish everybody on your network had Internet Access but not the high costs and complexity associated with multiple accounts. If this is you, then the IS-200 IP Sharing Device is for you. By using a single Internet account with the IS-200, your whole network can have Internet Access simultaneously. The IS-200 can also act as a DHCP server and offer Firewall protection and connects to the Internet through either a 56K modem or ISDN terminal adaptor.

NEW



$295 DSADE040

USB CABLES

USB A CABLE

USB B CABLE



Code	Description	Price
CBGEN178	2M USB A-A CABLE	$15
CBGEN179	2M USB A-B CABLE	$15
CBGEN180	3M USB A-A CABLE	$18
CBGEN181	3M USB A-B CABLE	$18
CBGEN182	5M USB A-A CABLE	$25
CBGEN183	5M USB A-B CABLE	$25

USB TO IEEE-1284 BRIDGE

Connect your printer to your PCs USB Host controller with ease. Transparent and full automatic support for true bi-directional communication between your computer and your printer with no conflicts or installation hassles. Free up your parallel for other devices such as ZIP drives, Scanners and CD-ROMs by moving your printer to a USB port today!



$55 CBGEN160

USB ETHERNET ADAPTER

The USB Ethernet Adapter provides an easy way to connect a USB-enabled desktop or laptop PC to a 10BASE-T Ethernet LAN. It uses a USB type A receptacle for connection to the USB port and RJ-45 receptacle for connection to the network. No more internal PC cards to deal with. Just plug it in and your ready to go (PnP). Compatible with desktop and notebook computers. For use with IEE802.3 10Base-T LANs.



$95 DSADE043

USB to MODEM ADAPTER

With the UC-232, ATEN's new USB to Modem Adapter, installing an external modem is a snap. Free up your serial ports for other devices while IRQ conflicts will be a thing of the past. With our UC-232, installing a modem has never been easier. Just connect one end of the adapter to your modem and the other to your computer's USB port.



$69 DSADE042

Cases

EXTERNAL IDE CD-ROM CASE



It has never been easier to add a CD-ROM to your PC. With the Portable CD-ROM, you are only one cable away from numerous CD titles and flexibility. Connects to your Windows or DOS PC via the parallel port (LPT).A printer passthrough interface is also included so that your printer can work simultaneously with your CD-ROM.

$130 CAADE008

EXTERNAL SCSI CD-ROM CASE

Use your Internal SCSI CD-ROM or drives as a portable & removable device with the External SCSI CD-ROM Case. Easy installation for both MACs & PCs the External SCSI Case comes with a SCSI ID selector so that changing SCSI IDs is as easy as clicking a switch. The external SCSI interface is a Centronics 50 with pass through.



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CAADE015	SCSI II DB50 Case	$150
CAADE016	SCSI III DB68 Case	$185



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W: 180mm
D: 340mm
H: 390mm

$65 CAADE000



ADELONG ATX CASE AT/ATX
W: 200mm
D: 450mm
H: 410mm

$95 CAADE014
Styles may vary

DELUXE AT/ATX 230 WATT DESKTOP CASE
W: 442mm
D: 473mm
H: 155mm



$135 CAADE012

Power Supplies

Code	Model	Price
PSGEN000	200W AT POWER SUPPLY	$35

Code	Model	Price
PSGEN002	200W ATX POWER SUPPLY	$55

Adelong Computers

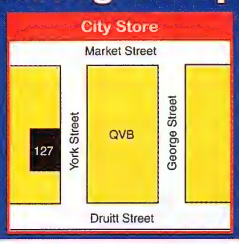
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Adelong will not accept any courier charges for return goods. Carriage for warranty repairs must be paid for by the customer. A returns authorisation number (RA#) must be obtained before the return of any product. A returns number is valid for 14 days only. Failure to display the RA number will result in the return being refused.

We reserve the right to stipulate that our warranty on PC's and Parts overrides all other warranties that might be stated by the manufacturers.

If paying by cheque please include your drivers licence details

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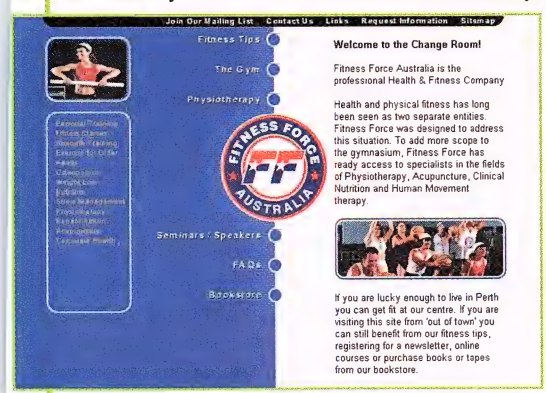
www.fitness.com.au; Description: This is an Australian fitness site which gives tips and advice and also has a real brick and mortar centre in Perth for you to put the theory into practice.

In case you thought that an Internet fitness site was slightly farcical—after all, you're basically sitting motionless in front of the screen while on the Internet—this site destroys those misconceptions. Without a good knowledge of the best methods to stay and achieve fitness for your body type, exercise can be as detrimental as it can be advantageous. Therefore www.fitness.com.au offers you fitness tips, online courses and online advice channels. You can write in with questions and purchase books and tapes online. The site is linked to Amazon.com, so there is always a good description of the books on offer and a good price.

The help is personal and also communal, so that you can take care to exercise in the safest way for you but also choose courses that you can attend with your friends as well. A newsletter can be sent to your e-mail address should you request it and you are notified of speakers and seminars appearing in the Perth centre.

Should you live far from the fitness centre in Claremont, Perth, the site also allows you to find other centres to attend to your needs—there are 28 links to other fitness centres throughout Australia. The site also gives you access to a number of special membership-deals.

—Helena Keers





Fitness Link

www.fitnesslink.com; Description: This is a global fitness Web site that gives advice on exercise, nutrition and a balanced mind which are all important topics for a healthy lifestyle.

If you are even remotely interested in what gives you energy and what activity is most suitable for your daily fitness needs, look no further. Although just a Web site, visitors are still able to access information just like in a real centre for fitness training. In fact the information on this site is so all-encompassing, it's an almost daunting task to trawl through all the relevant lessons. Naturally, there are also links to a great deal of other Web sites and addresses for a number of gyms where again you can start to put into practice the ideas you have gathered.

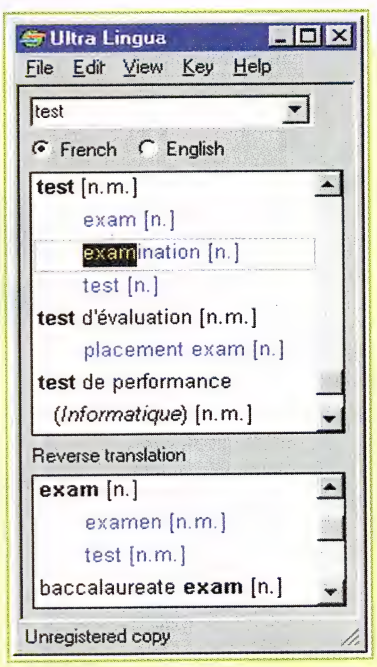
To begin with, the site offers two newsletters: *The Fitness Newsletter* which comes out on Mondays and Thursdays only and offers tips on all sorts

Products Online

Ultra Lingua French-English Dictionary

Ultra Lingua Software; Download price: $25; Free download available; www.ultralingua.com

Ultra Lingua is an extensive French-English dictionary. You'll seldom be at a loss for just the right word with this collection of 250,000 keywords and tens of thousands of secondary entries, slang, technical terms, and sample phrases. Type in the word or phrase and instantly see suitable translations. Check that you don't create an unintentional faux pas by viewing the reverse translation window to ensure that you've said it right. Spellings, parts of speech, and idiomatic usage are also shown. Documentation, in both WinHLP and HTML format, explains the program features. There's also detailed info on grammar in the chosen language.



You can also go online and check out grammar references and use sample forms to help you produce French correspondence. Once your English has been translated, you can drag and drop your French text into other applications too. Local users will also be happy to hear that the program supports US and British English spelling.

—Mary Johnson

of diet and exercise difficulties, then, Monday to Friday, there is the *No Sweat Trivia* newsletter, which, as the title denotes, releases all sorts of trivia about sports and work-outs.

There is a good search facility on the site, though the page titles are descriptive enough to make this almost redundant.

The exercise programs, nutritional courses, mind techniques, weight loss and outdoor adventure pages are all self-explanatory. The virtual gym has not yet been set up but promises a listing of all the equipment found in any gym and an explanation of how each machine works and what its function is.

And then we have a bit of stereotyping which, if not taken too seriously, is amusing. There's a women's locker room where you can check out information on topics such as pregnancy, family issues, and babies. The site also includes a male pin-up of the week. The men's locker room on the other hand covers topics such as weights—and includes a female bodybuilder pin-up of the week. If this all sounds rather amateur, then click on the Pro's Centre and here you'll find all the information you might need regarding fitness associations, education, conventions, career moves and instructorships.

For those doubting the site's effectiveness, there is also a page full of consumer survey results for you to browse.

—Helena Keers



MusicMaker.com

www.musicmaker.com.au; Description: Custom build your own audio CDs.

Musicmaker is one of the best custom CD manufacturers on the Net. Search their extensive database to fill your CD with up to either 70 minutes of music, or twenty tracks. Their music collection has something for every occasion, covering 35 genres including Bluegrass, Hannukah, Industrial and Ska.

There are 25-second samples of each track, and you can add or delete tracks at any time. Musicmaker's only stipulation is that a minimum of five songs are on each CD, a sixth song will then be given to you free of charge. It costs roughly US 99¢ per song plus US $5.95 for delivery anywhere in the world. We put together a CD with ten songs that used the full 70 minutes for approximately $25 (Australian) including postage.

—Peita Duggan



Furniture eMart

www.furnitureemart.com; Description: Australian Furniture of all kinds available for sale online.

When you think of furniture shopping you don't typically think of buying online—but that is sure to change as the popularity of online shopping soars. One store,

Products Online

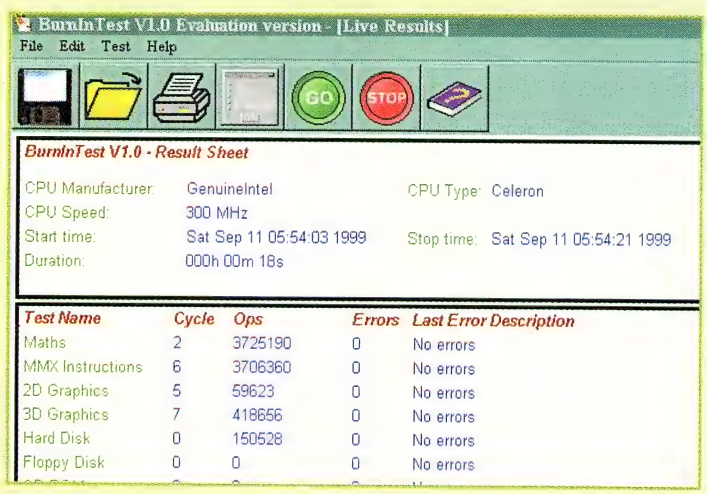
BurnIn Test

Passmark Software; Download price: US$19; Free download available; www.passmark.com

BurnInTest can simultaneously test the major subsystems of a computer for stability and reliability. Using an interface that's both attractive and friendly, it exercises a PC's hardware in a short time frame, just as normal applications use your computer over the long haul. It tests the CPU, hard drives, CD-ROMs, sound cards, 2D and 3D graphics, and printers. These processes can be run simultaneously since BurnInTest is a 32-bit multi-threaded Windows app.

Results can be saved to disk and/or printed. It's said that most computer hardware tends to fail early in its life. BurnInTest would be a great tool to use before a PC is put into service for any technician or home user.

—Mike Lovelace



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This original Sound Blaster sound card is completely refurbished with CD quality sound and true stereo performance. It has an ISA interface 16bit and Win 95/98 will auto detect as well!

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Furniture eMart has decided to jump in and start offering its range of furniture for sale online.

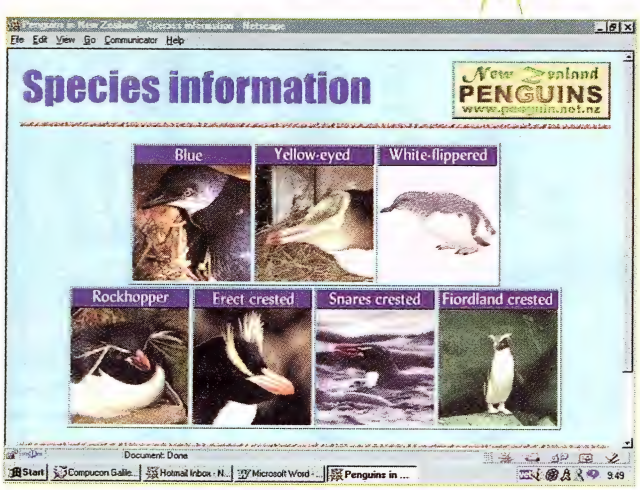
At the site you'll find sofas, dining room furniture, dressers, entertainment units, desks, bookcases, even bedroom furniture. Prices are good, and delivery is cheaper than you might expect. A $369 three-door chiff, for example, delivered from Furniture eMart's factory in Perth to Sydney will cost you $60 delivery.

The site includes thumbnail pictures of all the furniture items. You can click on these to see bigger photos. You can also choose from a variety of stains available for your timber furniture and fabrics for your sofas.

You'll find clear descriptions of all the items for sale. Prices are generally in line with or cheaper than what you would find in retail stores.
—Anna Raciti

Penguin.net.nz

www.penguin.net.nz ; Description: This is a well-planned and beautifully designed site,



which combines a host of information about the lives of and threats to penguins.

There are of course many types of penguins, and the first place you should go to on this site is the species information page. Here, there are splendid photos of various penguins, as well as information about them and maps outlining their natural homes and habitat. For further interest, there is also a page outlining the threats to penguins, including marine perturbations, fisheries, habitat degradation, and predators (indigenous or introduced). If you are an avid penguin researcher then you can also find out where the best places, both private and public, are, for viewing the creatures. This list is ever growing and adapting as people write in with tips and sitings. You too can write in or simply take advantage of the news and link to the various sites, which are outlined, pertaining to the siting grounds.

The links on this site are very well researched. On the conservation page, you can find out about government and charity help for penguins, as well as get notification of events, such as, seminars and conferences. On the book page, the link is to barnesandnoble.com bookstore, which provides a number of well-researched texts about Penguins. On a lighter side, there is a page of games including jigsaws and puzzle shuffles as well as a free downloadable Penguin 2000 game.

Should you wish to make your wallpaper or start up and shut down screens pictures of penguins, there are a number of downloadable images.

There is also an excellent index and search facility should you have a specific inquiry, which is not addressed in the Frequently Asked Questions page. And finally, as there should be
for such a lovingly prepared site, there is a credits page where you can find out a little more about Dave Houston the author and sire of the site. *—Helena Keers*

Products Online

SoHo-123

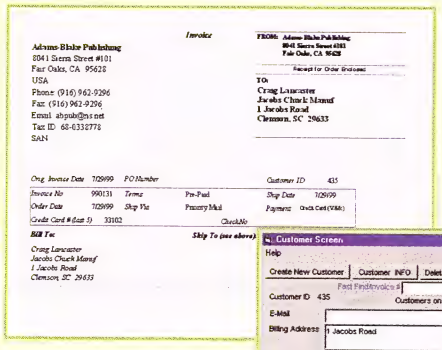
Adams-Blake Publishing; Download price: US$149, Free download available; adams-blake.com

Soho-123 is an easy-to-use database application for any small sales business. You'll feel immediately comfortable with the clear interface, well-written documentation, and logical data tables that make entry easy and searching a breeze.

SOHO-123 does invoicing, inventory, contact-management, royalty/license fee computations, and management reporting. It's a program specifically designed for the types of businesses that do not have staff to handle routine chores—here procedures need to be easy enough for everyone to learn and do.

If you download the trial version first, you'll find yourself wishing there were some sample data to explore or an import function to get your info into the database during the 10-day trial period, but Soho-123 is otherwise well done.

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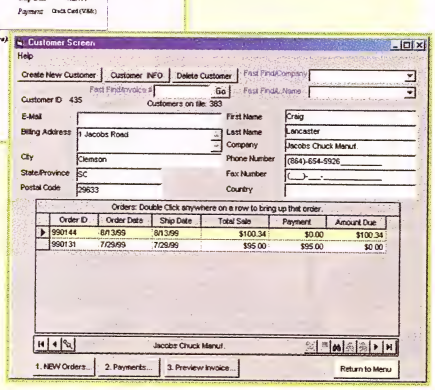
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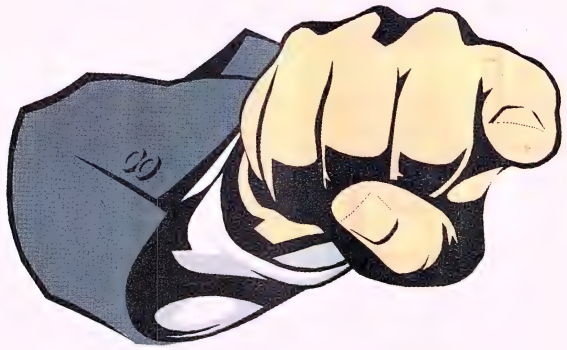
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Credit card transaction records export to most credit card record software, and accounting numbers can export to Quicken or Quickbooks.
—May Johnson

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Motherboards Comparison

RMIT PC Test Labs looks at the latest in motherboard technology in this product comparison.

MP3 Players

RMIT looks at the portable sound machines of the future. And we compare features and performance to find the best of the bunch.

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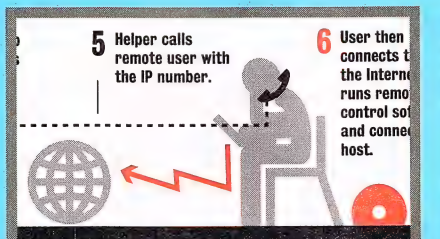
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TOOLS & TIPS FOR THE INTERNET AGE



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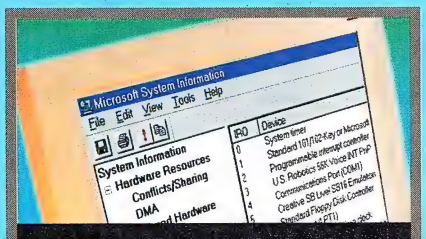
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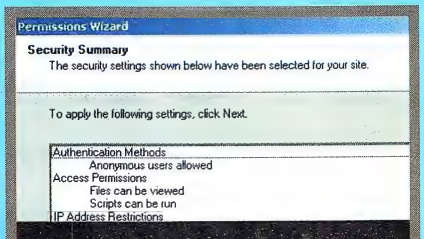
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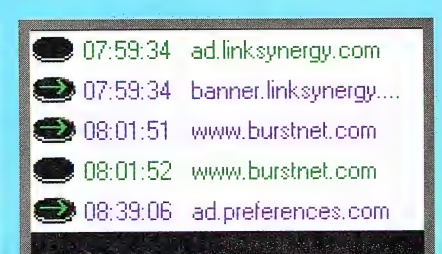
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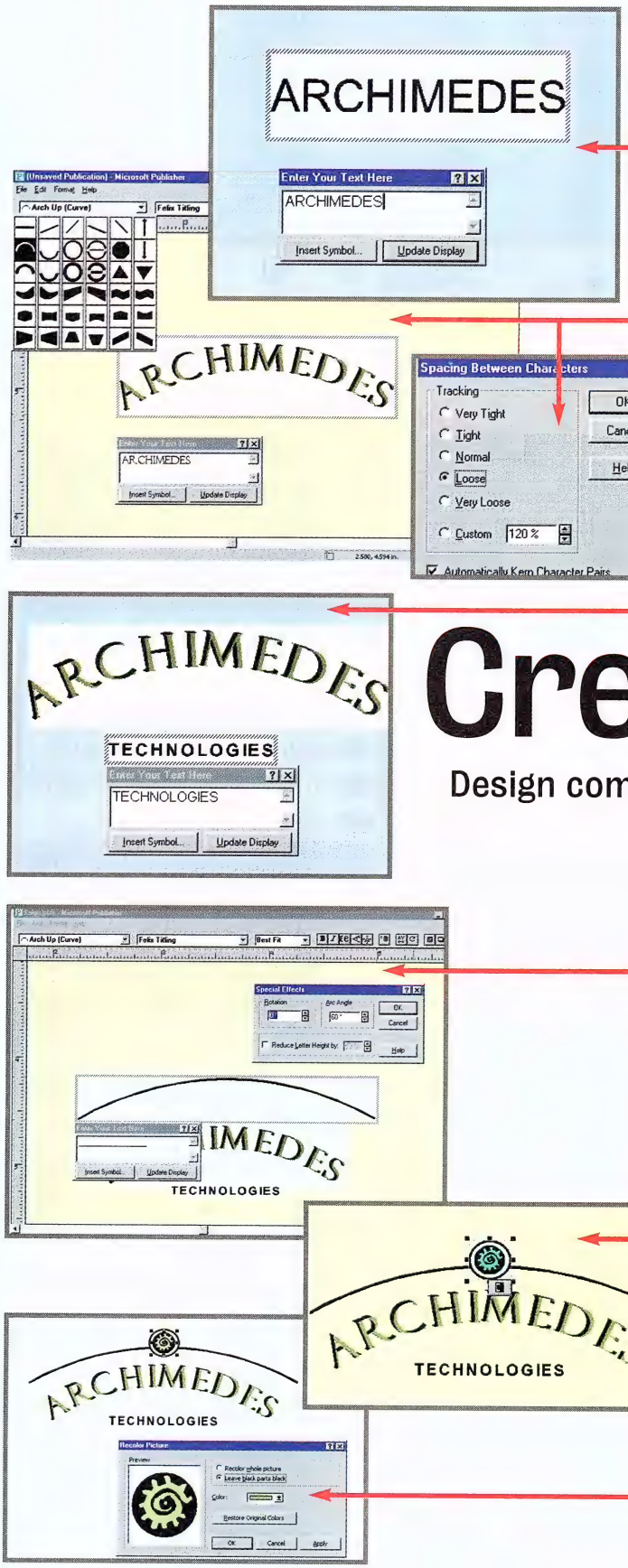


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ILLUSTRATION BY CATHIE BLECK

Create Logos

Design company and other logos using a tool



WordArt Step by Step

You can create a professional-looking logo by following these steps:

Step 1. Select the WordArt tool and draw a frame. Enter the company name.

Step 2. Using the WordArt toolbar, apply the Arch Up (Curve) shape, the Felix Titling font, and the Best Fit size. Make the text bold, and shade it with the Olive colour. Choose the Center Alignment option, and the Loose option for Spacing Between Characters. Open the Special Effects dialog box and adjust the curvature of the arc to 70 degrees. As a final touch, apply a bevelled black shadow.

Step 3. Draw a second WordArt frame, and enter the rest of the company name. Make the text bold, colour it black, and set the Spacing Between Characters to Loose. In Publisher's workspace, use the arrow tool to centre the word Technologies below Archimedes.

Step 4. To create the curved line above the word Archimedes, draw a third WordArt frame, In the WordArt text box, type 15 underline characters. In the Special Effects dialog box, change the arc angle to 60 degrees. Use the arrow tool to centre the curved line above the word Archimedes.

Step 5. Import a clip art symbol. To frame the clip art, draw a circle. Fill the circle with solid white and apply a 1.25-point black border. Send the circular border behind the clip art image, then select both objects and use the Align command to place the clip art in the centre of the circle. Group the objects and move the group to the centre of the curved line.

Step 6. Open the Recolor Picture command to apply the same colour to both the Archimedes WordArt element and the imported clip art image. Select the option that leaves the black parts of the picture unchanged, then define a custom RGB colour where red is 153, green is 153, and blue is 0. This colour is very similar to the Olive colour in the WordArt dialog box and has the added benefit of displaying properly on the Web.

in WordArt

you probably already own.

By Luisa Simone

Businesses large and small alike use typographic designs for corporate letterheads, conference communications, and even logos for the company softball team. Oddly enough, most users are unaware that if they own Microsoft Office, they already have the ability to create text-based logos using its included WordArt miniprogram.

The WordArt tool lets you mold text into geometric shapes, align it along arcs or circles, and create unusual fill or shadow effects. Unlike full-featured drawing programs such as Corel Draw or Adobe Illustrator, WordArt doesn't require you to be an artist or to understand the intricacies of kerning and baseline shifts. WordArt's effects are achieved through simple drop-down menus and dialog boxes.

Creating a WordArt logo is a simple process:
Step 1: In Word, choose **Insert | Picture | WordArt,** or in Publisher, choose **Insert | Object | Microsoft WordArt.** Step 2: When the **WordArt** toolbar and text-entry box appear, type your copy. Step 3: Use the toolbar to apply special effects to the text. Step 4: Click anywhere outside the WordArt frame to return to the program's normal operating mode.

WordArt does have a few limitations. It relies on TrueType fonts (PostScript fonts are not supported), and the text can only be formatted with a single font and a single effect. So if you want a logo to contain multiple fonts at different point sizes, you'll have to create several different WordArt objects and group them together.



FIGURE 1: One strategy for creating a logo is to align two words of different lengths.

We can't give you a formula for logo design, because the best logos begin with old-fashioned inspiration. However, we can run through a few design techniques.

ALIGN ELEMENTS

When you begin your logo design, you should look for meaningful relationships between individual elements. A company name often contains primary and secondary words that suggest a corresponding visual relationship. In Figure 1, we created a logo where the most important word is big, and the supporting text is small. Nevertheless, the logo is clearly a single, cohesive unit, because the secondary text element is as wide as the word above it.

WordArt makes it easy to size, space, and align multiple text elements. You can resize the text elements interactively simply by resizing the WordArt frame. More importantly, when we applied the Letter Justify alignment option to the word Construction, WordArt automatically added the appropriate amount of space between each letter to space the phrase evenly across the frame.

RESHAPE TEXT

Because WordArt treats type as vector outlines, it can modify the shape of a letter or the shape of the baseline along which text flows. This ability to twist and turn letters lets you match any text phrase to the shape of underlying geometry.

The most common example of this is text running around a circle. In Figure 2, the shape of the globe provides a perfect circle around which we wrapped the name of a conference. But WordArt's drop-down menu offers a wide variety of shapes, including, arcs, triangles, convex or concave lenses, wavy banners, and perspective rectangles.

If you want a professional-looking logo, you'll have to tweak the effect. Even in Figure 2, which is a straightforward circular wrap, we found it necessary to rotate the text 35 degrees and to add a bullet symbol between each word in order to keep the text legible.

Our opening, step-by-step example is a more sophisticated version of Figure 2. Instead of wrapping text around a circle, we flowed it along an arc. In Publisher, the Special Effects dialog box can flatten the arc (from 180 degrees to 70 degrees) in order to produce a more subtle elliptical shape. In Word 97, you can rotate the text using the Free Rotate tool and flatten the arc by resizing the frame containing the text.

ENHANCE TEXT WITH FORMATTING

All three of the logos shown here take advantage of WordArt's formatting attributes. On the simplest level, you can change the colour of text. But, as shown in Figure 2, the ability to change the fill colour separately from the outline colour opens up a world of design possibil-

Using Card Stock with Publisher

I want to print a card I've designed with Microsoft Publisher on card stock. I have defined a custom paper size for my printer, but Publisher doesn't recognise the custom paper size when I choose it in the Print Setup dialog box.

DAVE ZEISS
via the Internet

You've discovered a long-standing bug in Publisher. Choosing a custom paper size from within Publisher's Print Setup dialog box never works properly. Luckily, the workaround is simple. Open the Print dialog box instead. Then click the Properties button (which appears next to the printer drop-down list). In the printer's Properties dialog box, choose the custom paper size you've defined and then click OK twice to return to your document. Publisher will display the page at the proper size in the work area, and more importantly, it will print your card correctly. —LS

Get the Previous Record's Data

I'm trying write a program that accesses data in the previous record, using code from Microsoft's Knowledge Base. I copied the code into my Access application and tried it at the Report, Form, and Module levels, but it won't work. The best I can achieve is a `#Name?` error.

F. D. FARMER
via the Internet

`#Name?` errors occur when a field has the same name as a control. When you add a field to a form, Access creates a text box control and assigns it the same name as the field. If you leave the name that way, ambiguities arise when Access tries to determine whether you're referring to the field or the control in your expressions.

Because of this, changing the control's Name property to something different from the name of the field is always a

good idea. For example, one common technique is to append the prefix ctl, so that the text box for a field named OrderID would be called ctlOrderID.

—Sal Ricciardi

Inserting Today's Date in Access

Is there a way to create a macro to insert today's date in a date field in Access?

STEVEN SAYCE
via the Internet

There's no need for a macro that inserts the current date. Access as shipped has a shortcut command for inserting the date: Ctrl-; (semicolon). Simply move to the appropriate field and type the shortcut. A related shortcut worth mentioning is Ctrl-: (colon), which inserts the current time.

—M. David Stone

ities. In this case, we filled the text with light blue, but defined the type with a black outline.

The sample logos here also illustrate the range of WordArt's shadow effects. The Meehan logo employs a cast shadow effect to give the text a 3-D quality. The shadow in our Archimedes example looks more like embossing, because we chose a beveled shadow and changed the colour to black. Though all of these effects add visual complexity, they are easy to apply.

We also applied more subtle formatting attributes to these text elements. For example, we loosened the letter spacing in the Archimedes logo to make the type more legible. And, in several instances, we boldfaced text elements to give them a little more weight.



FIGURE 2: You can change the text baseline's shape; in this case, we used a circle.

ADD DRAWN SHAPES AND CLIP ART

Even logos that consist primarily of text will often need supporting images. Microsoft Office provides an extensive clip art collection, easy mechanisms to import pictures from other sources, and simple drawing tools.

Clip art pictures—especially if they're generic enough to be read as abstract symbols—can greatly enhance a logo. Our sample logos provide a useful demonstration of this. In one case, the image of a globe provides the unifying shape for the logo and plays off a word in the text. In the other, a small, roughly drawn design adds a visual accent that echoes the archaic reference in the company name.

You'll often find that a simple geometric shape is all you need to give structure to a logo. In the Meehan Construction logo (Figure 1), we added a dark rectangle as a background for the small white text element. The rectangle also serves as a visual anchor for the design. Likewise, the Global Marketing logo in Figure 2 contains two additional circles filled with light blue gradients. And the Archimedes logo contains a curved rule that mimics the shape of the text arc.

With some practice and imagination, you can do a lot of wild and wonderful things with WordArt. The crib sheet shows three of our favourite ways to get even more of a design bang out of this little utility.

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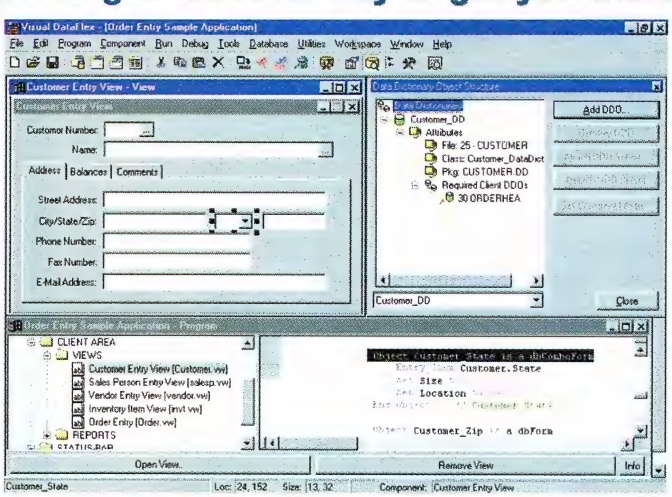
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Remotely Control Your PC Over the Internet

It's usually the cheapest way to use your PC from afar, but there's a trick. By M. David Stone

Remote-control programs such as Carbon Copy, LapLink, NetOp, and pcAnywhere let you connect to your host computer over a direct cable, a LAN, a phone line, or the Internet. The last choice has the advantage, because you can use your office system from just about anywhere with a local call, instead of having to pay long distance phone charges.

The hard part is that the remote system needs to know the host's IP address in order to connect. This is not a problem in a large corporation with a permanent Internet connection such as a T1 line, or even in a small business connected permanently by a fractional T1 line, cable modem, or DSL. In these situations, you have the same IP address at all times.

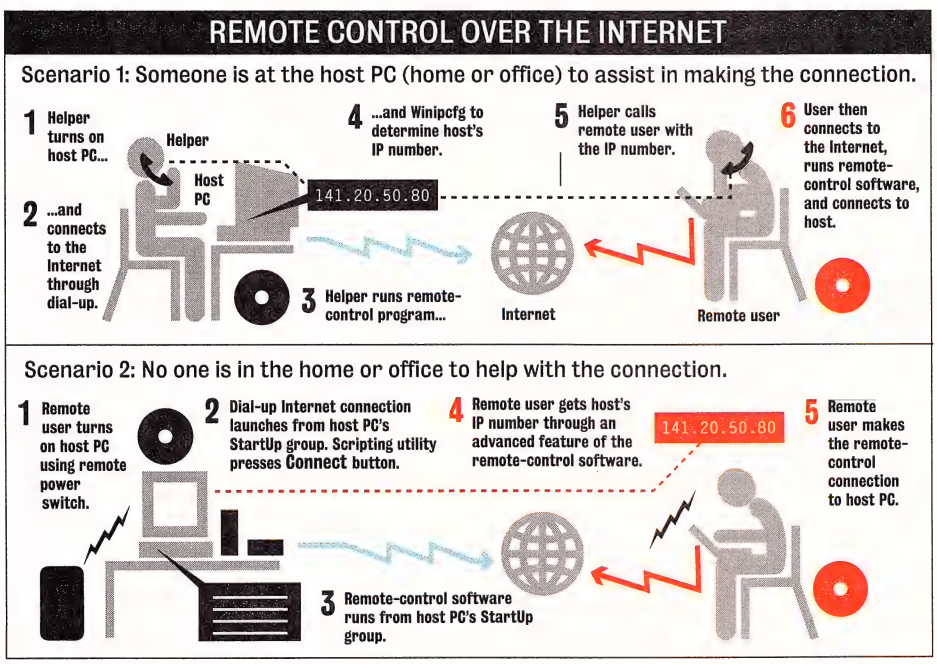
But there's a problem if you connect by modem. ISPs usually assign a different IP address every time the modem connects. Before you can use remote-control software over the Internet, you have to know the host's IP address.

The good news is that even if your main system connects to the Internet strictly by modem, you can still take advantage of remote control over the Internet.

There are four possible situations, depending on two factors: First, you may be using a program like pcAnywhere 9.0, which offers special features that make finding a host's IP address easy. Alternatively, you may be using a program—including earlier versions of pcAnywhere—that doesn't help you find the host's IP. For both of these possibilities, you may or may not be able count on someone being in your office when you need to connect.

In this article, we'll discuss the strategies available for connecting in three of these four situations. The fourth—connecting to a system when no one's in the office and with no feature in the program to help you find the host over the Internet—is not worth wasting time on. You're better off upgrading to a program that provides the support to help you find the IP Address.

We won't discuss establishing a connection, since this depends on your specific program. You should be able to get this information from the software vendor in any case. You should also check with the program vendor for hints on keeping your office system secure when it's logged on to the Internet and waiting for a call.



Multiple Attachments In Outlook Express

How do I send more than one attachment in an e-mail using Outlook Express 5?

MARTY GOLD
via the Internet

While composing the message, select File Attachment from the Insert menu. If the files you want to attach are all in the same folder, you can select them all at once. To select a continuous range of files, click the first, then hold down Shift and click on the last. To select or de-select individual files without affecting the selection status of other files, hold Ctrl while clicking on them. If the files are not in the same folder, just select one, click OK, and choose File Attachments from the Insert menu again, as many times as necessary.

Some of your correspondents may have limits on the size of the e-mail messages they can receive. If the files you want to send are very large, it may be better to send them separately. —Neil J. Rubenking

Why No FTP Over a Fast Connection?

I use FTP to upload and download files from a site that was set up specifically for me, but I can no longer see the directories on that site when I connect from home. That is, I can't when I use a high-speed connection (dial-up connections work fine). The FTP client connects, but then it tells me it didn't receive a command. Any idea what's up?

NIGEL THOMAS
via the internet

What's up, quite possibly, is that your high-speed Ethernet card is going through a firewall and the firewall doesn't let the transaction take place. In some FTP clients (the popular WS-FTP, for example), you can set the configuration to use passive transfer mode. In this mode, the client is responsible for establishing the FTP connection, a duty normally handled by the server (it revers-

es the role of initiator and listener for the FTP protocol). If this doesn't help, try a different network card. —Neil Randall

Blind Copies in Outlook Express

Is there any way to send a message to multiple recipients in Microsoft Outlook Express without everyone seeing everyone else's addresses?

RICHARD VICANTE
via the Internet

What you're looking for is called a blind carbon copy, or BCC, option. To use BCCs in Outlook Express 5, start a new message and choose View | All Headers.This will add a BCC line just under the CC line in the header, and will turn the feature on for all future messages unless you choose View | All Headers again to turn it off. Any e-mail addresses you enter in the BCC line—separated by commas or semicolons—will not show in received messages. —MDS

Avoid Restarting Windows

Whenever I log onto my company network from home, I have to change the TCP/IP settings (DNS servers, gateway server, and so forth) in Control Panel | Network. After I log off, I change things back so that these settings are reset automatically by my ISP (that is, I blank all the TCP/IP settings). Of course, this means I have to restart Windows in each case. Is there any way around this constant restarting?

S. JAMIESON
via the Internet

There is an easy way around, in fact. As always, use the Network applet in Control Panel to change the IP numbers and domain addresses, but when Windows tells you to restart, don't listen to it. Click the Cancel button, then dial in to your ISP or company network, whichever you've configured the Network app to allow. You can keep doing this over and over, but remember that when you do restart Windows, it will load with the last network settings you specified before you shut down. —NR

IF SOMEONE IS IN THE OFFICE

Knowing that someone will be in the office when you call means not having to worry whether the system is connected to the Internet when you want to log on, or even whether the system is on. A quick (read: inexpensive) voice call to the office will be enough to get the system set for an incoming call and get you the information you need to make the connection.

Your strategy in this case would be to make the voice call, then ask your helper to set up the system as necessary—which might include turning it on and will include connecting to your ISP. Once connected, some programs will make finding the IP address simple. With pcAnywhere 9.0, for example, you'll find the IP address in the **Host Status** screen that also confirms the program is waiting for a call.

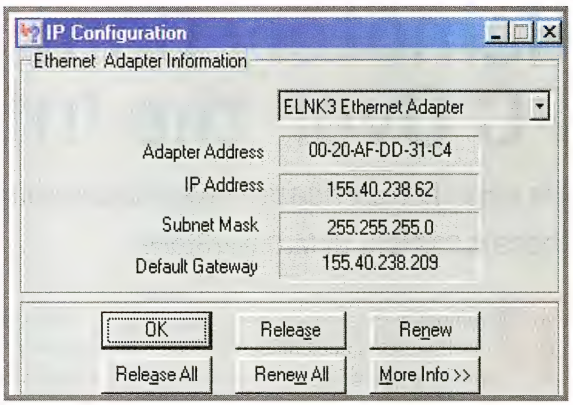


FIGURE 1: This standard Windows utility quickly displays your Internet-connected machine's IP address.

For programs that don't hand you the IP address, Microsoft Windows 95 and 98's Winipcfg does the job. Choose **Start | Run,** then enter the program name and choose **OK** (see Figure 1). (You could also run the DOS utility Ipconfig, which requires opening a DOS window, a longer wait, and then closing the lingering DOS window.) A still more elegant choice is to create a shortcut to run Winipcfg from the desktop, the **Start** menus, or the **Quick Start** toolbar.

However your helper gets the IP address, he or she can read the number to you, after which you hang up, establish a connection to the Internet on your side, and enter the host's address in the appropriate place in the program.

If your helper is too rushed to give you the information but your remote operations program offers a way to get the IP address automatically, then all the helper has to do is establish the host PC's internet connection. With pcAnywhere, you can set the remote system to scan every IP address available through your ISP and return a list of pcAnywhere hosts waiting for connections. You can also get the IP address by running ICQ (a program and online service available at **www.icq.com**) on both host and remote systems.

IF NO ONE'S IN THE OFFICE

Even if you can't count on someone being in your office to help set up a session, your strategy for establishing a remote session is straightforward, as long as the program offers some way for you to get the host's IP address.

The only new twist in this situation is that you have to set up your system to do everything automatically: turn on, call your ISP, and load the host software so it's ready for you to log on from a remote location.

Turning the system on is easy with a remote power switch, such as the Server Technology's Remote Power On/Off+Aux (**www2.servertech.com**) or the Deltronix Remote Power Switch (**www.deltronix.com**). The Server Technology switch will turn your system on when you call and then turn it off after you hang up, waiting as little as 2 minutes or as long as an hour, based on your settings. The Deltronix switch lets you turn the system on and off manually by calling in and punching in a command from a touch-tone phone.

Setting your system to connect automatically to your ISP and to launch the host program on boot-up is also straightforward. Most remote-control programs have some way to be automatically launched in host mode so that the system is ready to take a call. In pcAnywhere, for example, you'll find a check box in the host properties to **Launch with Windows**. For other programs, you may have to add a shortcut to the program in your StartUp folder. Depending on your version of Windows, you may be able to drag the shortcut to the **Start** Menu, then to **Programs,** and then to **StartUp**. Alternatively, you can use Windows Explorer to copy the shortcut into C:\WINDOWS\Start Menu\Programs\StartUp.

Once you've set the program to start automatically, create a shortcut for the Dial-Up Networking entry for your ISP and add that to your StartUp folder, too. You'll also need a program like RtvReco (shareware available at **www.rtvsoft.demon.co.uk/Default.htm**) to automate the entire process of pressing the **Connect** button and issuing other necessary commands. You can also set RtvReco to make sure that Windows reconnects if the connection is lost.

The final result should be that when you call your system and turn the power on remotely, the system boots up, connects to the Internet, loads the host software, and waits for you to start the session. You can then use the feature your remote-control program offers to let you find the right IP address, log on, and do your work.

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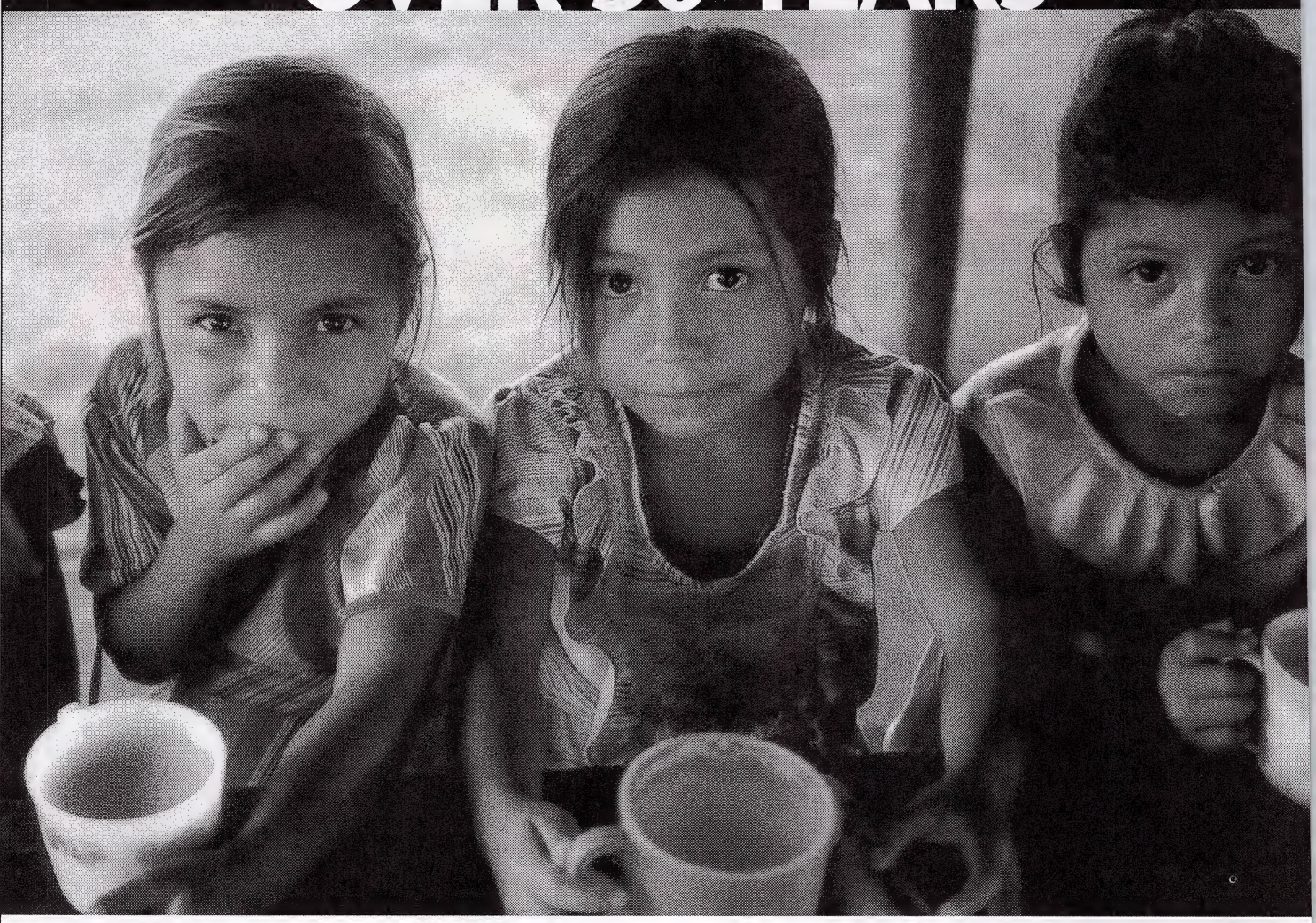
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Take Control of Explorer

Make Windows Explorer work your way. Command line switches are the key. By Neil J. Rubenking

Whether you're running Microsoft Windows 95, Windows 98, or Windows NT 4.0, you access the files and folders on your system using Windows Explorer. You launch it from the **Start** menu, or from a shortcut on the desktop, and it typically displays the contents of drive C:. Readers frequently ask how to make it start with a different drive, or start with **no** drives open. If you know the command line switches for Windows Explorer, you can make it start anywhere you want. You can use these switches in the command portion of a shortcut, at an MS-DOS prompt, or even in a batch file. This article will explain how the command line switches work and how some of them don't always work.

WINDOWS EXPLORER'S COMMAND LINE SWITCHES

Figure 1 shows the command line switches for Windows Explorer. They control the type of display Explorer will use, the initial folder and selection, and the scope of the Explorer window. Explorer can display the contents of a drive or folder in two different ways. If you right-click a folder and choose **Open,** you get a single-pane view (Figure 2). In this **open view**, each file or folder is represented by a large icon and a title. By default, Explorer "recycles" windows of this type. That is, if the desired folder is present in an existing open view window, Explorer will activate that window rather than opening a new one. If you right-click a folder and choose **Explore,** you get a two-pane view (Figure 3) called the **explore view**. Here, the folder tree appears in the left-hand pane, and the right-hand pane lists details about each file or folder, including the name, size, type, and last-modified date. If neither the `/n` switch nor the `/e` switch is present, Explorer uses the open view and recycles existing windows. The `/n` switch disables window recycling, forcing a new open view window. The `/e` switch forces explore view; when using this view, Explorer does not recycle existing windows. If both switches are present, `/e` is ignored.

The `subobject` and `/select,subobject` switches control Explorer's initial display. When you add a folder name to the Explorer.exe command line to open that folder, you're using the `subobject` switch. If you precede the full pathname of a file or folder with `/select`, Explorer launches with the specified file or folder highlighted and its parent opened. The command `explorer /e,/select,c:\windows\system` would open the c:\windows folder and highlight the system folder within it.

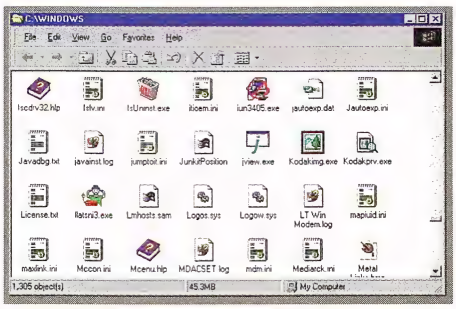


FIGURE 2: The open view shows files and folders as large icons in a single-pane display.

The `/root,object` switch is powerful but used less often. The root folder is the one at the top of Explorer's folder tree—the one that has no parent (Desktop, by default). By using the `/root` switch, you can specify any drive or folder as the root for Explorer's display. For example, you could create an Explorer window that displays only drive C:, with no direct access to virtual folders like Printers and Control Panel.

FIGURE 1: USEFUL SWITCHES

Explorer [/n] [,root,object] [[,/select],subobject]

(neither /n nor /e)	Launch Explorer in single-pane open view. If the new window would duplicate an Explorer window that's already open, simply activate the existing window.
/n	Launch Explorer in single-pane open view. Open a new window even if it duplicates an Explorer window that's already open. Overrides/e if both are present.
/e	Launch Explorer in two-pane explore view. Open a new window even if it duplicates an Explorer window that's already open.
subobject	Specify the drive or folder to be opened in Explorer.
/select, subobject	Specify the file or folder that will be initially selected; its parent folder will be opened.
/root,object	Specify the root of the Explorer display. The user cannot navigate upward past the root. By default, Desktop is the root.

PUTTING THE SWITCHES TO WORK

Here's a quick trick to get you started. Open an MS-DOS prompt, navigate to any folder that interests you, and enter the command `explorer /e,.` (That's **explorer, space, slash, e, comma, period.**) The single

Viewing Your USB Configuration

I enjoyed the article "Making USB Work" in a past issue of PC Magazine Australia. I have just started to take advantage of Windows 98's USB capabilities, and I discovered a program buried on the Windows 98 CD that will tell you everything you wanted to know about your USB configuration and then some. It's found in /tools/reskit/diagnose/usbview.exe. I copied it to my Windows folder and created a link to it in my START menu.

BRUCE PETERSON
via the Internet

You'll find the article at http://cgi.zdnet.com/slink?16289. As the article mentions, a variety of peripherals can be connected via the USB port—everything from digital cameras to mice, from scanners to fingerprint readers. USBview can be handy for diagnosing problems or for checking what devices Win 98 sees attached to the USB port.

To copy the usbview.exe file to your Windows folder, locate it in the right-hand pane of Windows Explorer, then scroll the left-hand pane so you can see the Windows folder. Right-drag the program onto the Windows folder, and choose Copy here from the pop-up menu. To add that link to your Start menu, drag the copy of the program in the Windows folder onto the Start button. —NJR

PrtSc Doesn't Print Screen

When I press the PrtSc key, nothing happens. Is there a way to get this to work on my Windows system the way it used to work under DOS?

JOHN SENEY
via the Internet

Under Windows, the PrtSc key captures your screen image, but instead of sending it to the printer as DOS did, Windows copies the image to the Clipboard. Note that you can capture just the active window by pressing Alt-PrtSc. Once the image is on the Clipboard, you can paste it into a graphics program—such as Windows Paint—and print from there.

If you want to make the process easier, a number of utilities available will do the job. For example, TechSmith's SnagIt (www.techsmith.com) can route the screen capture directly to your printer without showing a preview screen. (The utility does many other things as well.) There are many similar utilities available at ZDNet's Software Library (www.hotfiles.com), including a handy freeware program named PrintKey that can send your screen capture to a printer.
—Alfred Poor

Return of the Multi-Column Programs Menu

In Windows 95, the Programs menu would expand to multiple columns if necessary, but this behaviour disappeared in Windows 98. I found a way to re-enable this feature:

1. Start Regedit and go to `HKEY_LOCAL_MACHINE\Software\MICROSOFT\Windows\CurrentVersion\explorer\Advanced`
2. From the Edit menu, choose New, then String Value.
3. Type in `StartMenuScrollPrograms`
4. Double-click the new value and type `FALSE` as the data.

I think this tip requires that you have Internet Explorer 5 installed. Hope this is helpful to those who miss the Windows 95 behaviour.

STEPHEN D. FORDICE
via the Internet

Judging from our letters, this Registry tweak should send many readers into paroxysms of bliss. It does require Internet Explorer 5, which is why we didn't discover it when the topic first arose.

Previously, we suggested grouping similar menu items into submenus, thereby shrinking the Programs menu and eliminating the need for scrolling. This is still good advice; even a multicolumn menu can grow too large for easy manageability. By following the instructions above, however, you can eliminate the scrolling Programs menu. —NJR

period represents the current folder, so you get a two-pane Explorer window showing that folder. The command prompt is the best place to experiment with Explorer's command line switches. When you work out a combination you like,

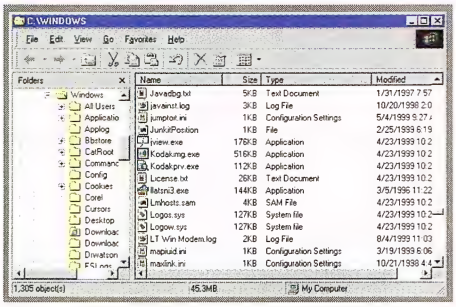


FIGURE 3: The explore view shows the folder tree on the left, file and folder details on the right.

you can create a shortcut using that exact command, or you can insert it into an existing shortcut. Here are several switch combinations to try:

`Explorer /e,/select,c:\`

This opens a two-pane Explorer view with none of the drives expanded. This is handy if you have multiple drives and use them all frequently.

`Explorer /e,d:\`

This opens a two-pane Explorer window that initially displays the contents of drive D:.

`Explorer /e,/root,d:\data`

This switch combination opens a two-pane window that initially displays the contents of the data folder on drive D:, and from which the user cannot navigate anywhere other than in or below that folder.

`Explorer /e,/root,d:\,d:\data`

This opens a two-pane window that initially displays the contents of the data folder on drive D:, and from which the user cannot navigate anywhere other than drive D:.

To create a new shortcut using a particular command line, right-click the desktop and choose **New | Shortcut** from the pop-up menu. Enter the full command line in the **Create Shortcut** dialog. If you have just tried the shortcut at an MS-DOS prompt, you can copy it from the prompt and paste it into the dialog. Click **Next** and give the shortcut a name such as **Explorer rooted on D**.

Now click **Finish**; you'll find the new shortcut on your desktop. To move it to your **Start** menu, simply drag it onto the **Start** button. This puts the menu item in the main body of the **Start** menu, above the **Programs** menu. To move the item into the **Programs** menu, right-click the **Start** button and choose **Explore.** Windows Explorer will display the shortcuts and folders that define the **Start** menu; just drag the shortcut into the Programs folder or into one of its subfolders.

To change a desktop shortcut's command line, right-click the shortcut and choose **Properties.** The **Target** field on the **Shortcut** tab of the resulting dialog is the command line you want (Figure 4). Enter your new command line. If the shortcut you want to change is in the **Start** menu, right-click on the **Start** button and choose **Explore** from the pop-up menu. Now navigate to the menu folder that holds the shortcut you want, and modify it as described here.

WHEN THEY DON'T WORK

In some configurations, the `/select,subobject` switch seems to fail. The subobject's parent folder is opened in the left pane and highlighted in the folder tree, but nothing is visibly highlighted in the list of files and folders. If you press Tab to move the focus to the detail list, however, you'll see that the subobject is indeed selected.

Microsoft's Knowledge Base notes several occasions where switches truly don't work. According to article Q208114, "Windows Explorer /N Switch Does Not Open a New Window" (**http://support.microsoft.com/support/kb/articles/Q208/1/14.asp**), the command `Explorer /n` fails to disable window recycling under Windows 98 and Windows 98 SE. Microsoft recommends using the `/e` switch instead. Article Q237494, "The Explorer Command Does Not Select the Correct File" (**http://support.microsoft.com/support/kb/articles/Q237/4/94.asp**), states that under Windows 98 SE, the `/select` switch without `/n` or `/e` may not select the correct file if the folder that contains it is already open. No workaround is offered.

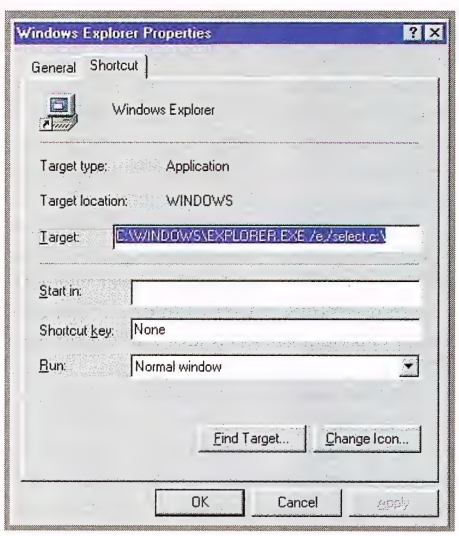


FIGURE 4: The Target field holds the command line executed by a shortcut.

These glitches are minor, though, and don't affect all systems.

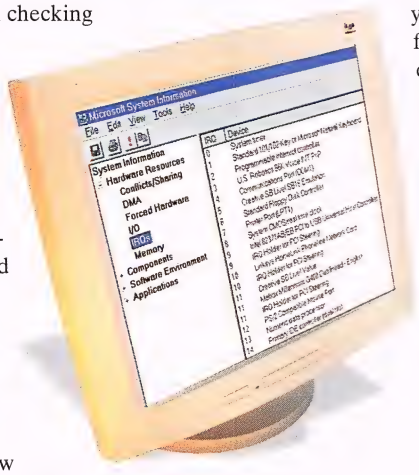
What to Look For in Your New Computer's BIOS

Although often overlooked, the BIOS can determine your new PC's potential. By Neil Randall

As a knowledgeable user, you wouldn't dream of buying a computer without asking about such things as the type of processor, the size and speed of the hard disk, the amount of system and video RAM, and the availability of slots and drive bays. Often left out of the discussion, however, is the BIOS.

The BIOS comes along with the motherboard, but BIOSes are not all created equal. If you're trying to decide between two or three machines, the BIOS is definitely worth checking out. Asking a few questions about the BIOS will help you understand the potential for configuring your machine in the near term and upgrading it in the future.

Newer BIOSes will probably contain the features listed here. But many users buy new machines that aren't actually current; this happens especially with machines selling through Internet auction sites, where the system (even if in brand-new condition) might be last year's technology. Even with these, you should pay attention to the BIOS you're getting.



MAY I INTERRUPT? The System Information utility lists your interrupts and shows how they are being used.

BOOTING OPTIONS

Most of the time, you'll boot from your main hard disk, the master drive of your primary IDE connection. But there are other options for boot locations: CD-ROM, floppy disk, removable drive, even a different hard disk (IDE or SCSI). Most computers ship with the BIOS set to check for an operating system (OS) in the floppy disk drive first, then on the main hard disk. Any modern BIOS also lets you move the floppy disk drive down the list so that the BIOS can check the main hard disk first, saving you a few seconds at boot time. Just remember to change this setting back if you want to boot from your Windows 95/98 emergency start-up disk, or your Windows NT, Linux, or BeOS installation disks.

There are times, though, when you'll want to boot from a CD-ROM. This is the case if your OS ships with a bootable CD-ROM. Set the BIOS boot order so that the computer searches the CD-ROM before the hard disk, and the machine will boot. But BIOSes on older computers usually don't let you set a CD-ROM as the boot drive. Make sure the BIOS on your prospective PC does (most now do).

You should also find out whether the BIOS will let you boot from a hard disk other than your primary IDE drive. This feature lets you select which drive you want to act as your main drive without forcing you to open the case and change IDE cable connectors. The BIOS will search the hard disks in the order you list them, launching the first OS it finds. With this feature, you can easily have, say, three separate hard disks in your system, each with its own OS. You can also use the feature to install two separate instances of Windows 95 or 98—otherwise impossible without boot-management software. If you have (or plan to have) SCSI on your system, see whether the BIOS will let you include a SCSI hard disk in the list of boot drives.

Note: This feature could result in an unwanted change in drive letters if you have multiple partitions on one or more hard disks. This may require you to reinstall programs or reconfigure the paths on which Windows should look for them. For example, let's assume you have a system with two hard disks (named Porgy and Bess), with two partitions on Porgy and three on Bess. Windows would name the drives differently in the case of either hard disk being listed in the BIOS as the first drive. Note that changing the boot drive will cause some or all partitions to change drive letters.

PRIMARY AND SECONDARY VIDEO CARDS

There may be a point at which you'll want to experiment with the multiple display support provided by Windows 98, Windows 98 SE, and Win-

Floppy Disk Surgery

A friend gave me some low-density floppy disks, and I heard that they can be changed into high-density disks. Is this true? And if so, how is it done?

TACI HUSIC
via the Internet

Low-density, 3.5-inch floppy disks have a total capacity of 720K, compared with the 1.44MB capacity of high-density floppies. Both are formatted with 80 tracks per side—and both are double-sided—but the difference comes from the fact that the high-density format uses 18 512-byte sectors per track and the low-density disks only use nine sectors per track.

There are some important physical differences as well. The most obvious is on the outside. Both formats have rectangular write-protect holes with plastic plugs that you can slide open to prevent the drive from writing or erasing data on the disk. High-density disks also have a second open hole on the other corner of the label edge; disk drives use this to sense whether or not the disk is a high-density disk.

Over the years, a number of companies have made gadgets that punch square holes in the correct location, causing floppy disk drives to treat low-density disks as high-density ones. These often work, but there are other differences in the disks. The high-density floppy disks need to store more bits per inch of surface area; as a result, they require a stronger magnetic field to record data. The media may be thinner than those of low-density disks as well.

It is not certain that punching a hole in a low-density floppy disk will result in a disk that really works as a high-density floppy. With new, preformatted floppies selling for 15 cents to 50 cents each, it may not be worth the effort to convert your older disks.—Alfred Poor

Fdisk and Hard Disks

I'm trying to install a SCSI card and disk, but I can't get Windows 98 to see the drive. Windows sees

the card, the card sees the drive, and during boot-up the disk is assigned as drive D:, but it doesn't show up in Windows. Am I missing a step?

DAN KIM
via the Internet

The step you didn't mention, which is likely to be the missing link, is that of running Fdisk to add a partition to the drive. Reboot in DOS mode and run the program from your /Windows /Command directory. Then choose item 5, Change Current Fixed Disk Drive, and make sure you pick the right disk to work with—presumably Disk 2—so you don't lose everything on your other disk. Then return to the main menu and choose item 1, Create DOS Partition Or Logical DOS drive.

Follow the instructions on the screen, reboot, and Windows should see the drive. Use Windows to format the disk and it should work correctly. —M. David Stone

CD-R Media Compatibility

I have recorded some of my favourite songs onto a CD-R disk that plays fine on my home stereo but won't play on my new portable CD player. The player won't even recognise that the disk is in the drive. Is there some solution, short of buying a new portable player?

TONJA LENDERMAN
via the Internet

The fact is that there are different types of CD-R media, and these different types can have different reflectivity levels. The difficult part is that different drives will work better with some media types than others, but there's apparently no reliable way to predict which combinations are most likely to work.

The best approach is simply to get some CD-R blanks of different brands—trade with your friends to get a variety—and then see which ones work best on your portable player. Some sources report that either the "green-on-gold" or "gold-on-gold" media work better with audio CD players than do some of the other types.—AP

dows 2000. This feature lets you install a second video card in your system so that you can use two monitors simultaneously. The problem is that most users with two graphics cards have their main one in an AGP slot and want to put the second in a PCI slot. (Windows allows you to use two of each, and if you have two PCI cards there's no problem. But most machines ship with only one AGP slot.) When you combine an AGP card with a PCI card, Windows treats the PCI card as the main card by default, exactly the opposite of what most people want.

But this isn't really Windows' fault, it's the BIOS's. Some current BIOSes let you specify whether the AGP or the PCI video card should be treated as primary. Even if this doesn't seem important now, it could easily be so later.

Note: If your BIOS doesn't offer you this choice and you add a PCI video card to your existing AGP card, you will probably have to remove the AGP card and its drivers, install the PCI card, and then reinstall the AGP card to let the system work with multiple displays. In such a case, the PCI card will be the primary display.

DISABLING PORTS

PCs have come a long way since the old days, but they're still hobbled in far too many ways by the limited number of IRQ (interrupt request) settings available to them. The PCI interface has helped, mainly by allowing IRQs to be shared more easily, but it's still too common to have your PC full of cards and for one or more of them not to work with the others. For this reason, make sure your BIOS allows you to disable the ports you're not using. Each of them, after all, needs an IRQ to operate.

Most BIOSes have an area of their setup screens that lets you disable the serial and parallel ports. With the increasing popularity of cable and DSL Internet connections and hardware that uses the universal serial bus (USB), it's possible to get by in many cases with only one serial port, maybe even none. You might not even need a parallel port if you don't use a printer. If you plan to use a USB mouse, look for a BIOS that lets you disable the PS/2 mouse port (another IRQ), but keep in mind that not all operating systems recognise USB devices. Figure 1 shows a setup with some IRQs that could be freed up.

Of course, freeing up IRQs is no guarantee that devices will use them. Many device drives insist on specific IRQs and can't be manually adjusted otherwise. Still, port disabling can be an important consideration.

CONFIGURING THE CPU

If you have one of the newer types of jumperless motherboards, there will be an area in your BIOS setup that offers low-level configuration settings that on most motherboards would require you to set jumpers on the board.

Instead of finding the correct jumper and changing its settings (an nearly impossible task without removing the motherboard from the computer), you simply change settings via the keyboard.

Given that this BIOS feature is about fiddling with your CPU's speed and voltage settings, look into it only if you know why you'd bother changing these things in the first place. It will help you experiment with processor overclocking (forcing your CPU to run at a faster speed than the manufacturer establishes), but you run the risk of rendering your system unstable.

You can change the voltage, but in doing so you could fry your CPU. But if you need these features for any reason, ask to see whether the computer you're considering has them.

BIOS BONUSES

There are plenty of other BIOS features worth inquiring about, such as reducing the number of tests the BIOS performs during the boot process (in order to shorten boot time), and password-protecting your system at the BIOS level, but these have been pretty well universally available in BIOSes for the past couple of years.

The features discussed above are more recent, so we singled them out for special mention. The point is that you want the most flexibility you can get with your system, and getting stuck with an options-challenged BIOS can significantly reduce your system's overall configurability and usefulness.

HELP FILE BIOS CHECKLIST

When you're shopping for a new PC, be sure to find out whether its BIOS has the capabilities below. If it doesn't, the machine is probably using last year's technology. Note that this is not an exhaustive list of features, but if your prospective PC's BIOS has these, you'll get the advantages of an up-to-date BIOS that should let you do the following:

- change the order of drives from which the PC looks to boot;
- boot from a CD-ROM;
- boot from a hard disk other than the primary IDE drive;
- specify whether the AGP or the PCI video card should be treated as primary;
- enable and disable USB ports;
- disable the serial and parallel ports;
- disable the PS/2 mouse port;
- reduce the number of tests the BIOS performs during the boot process;
- password-protect the system.

Internet Services in Windows 2000

The latest version of IIS brings greater power, flexibility, and ease of use to administrators and developers. By Keith Pleas

The latest version of Microsoft Internet Information Service is now shipping with Windows 2000 Server. As you would expect with a product in its fifth version, the changes are clearly evolutionary or additive. Still, IIS 5.0 offers new features and options that ease administration and Web development. Sites upgrading from the previous version should experience little or no difficulty.

IIS 5.0 uses the administrative interface introduced with the previous version: a Microsoft Management Console (MMC) snap-in showing all the services and sites in a tree view. You view and configure all options using an enhanced `Properties` dialog. Context menus for sites

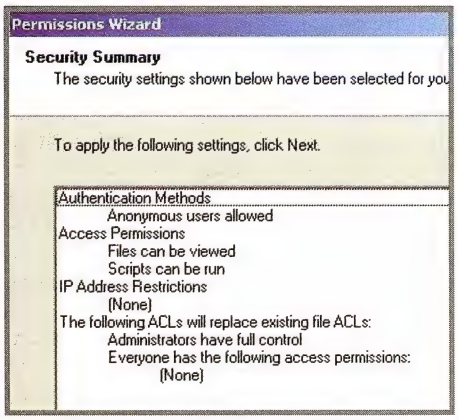


FIGURE 1: The new Permissions Wizard simplifies the process of assigning file permissions.

expose several new options, including a security Permissions Wizard (Figure 1) and the ability to install, remove, and verify server extensions. The Permissions Wizard helps you configure Web site access more easily by assigning access policies—including authentication methods, access permissions, IP address restrictions, and special access control lists (ACLs)—to virtual directories and files.

Under the hood, IIS 5.0 takes advantage of the new Windows 2000 recovery options for services. When a service fails, you can now set Windows 2000 to 1) restart the service, 2) run a file, or 3) reboot the computer for the first, second, and any subsequent failures. Together with the failure counter, this capability allows IIS run scripts that—for instance—page administrators when individual services fail. Also, by default, IIS runs all applications in a common or pooled process that is separate from core IIS processes.

Logging has also been extended: In addition to a new option to create hourly logs—important for high-volume Web sites—IIS can also be configured to log Process Accounting data, including such measurements as User and Kernel time, page faults, and terminated processes.

This lets administrators determine which sites are using too many resources or which might be malfunctioning; administrators can then institute process throttling to limit the percentage of CPU time allowed to individual Web sites for out-of-process applications.

HTTP support has also been enhanced. In addition to customisable error messages, IIS 5.0 includes support for HTTP Compression, which compresses both static and dynamic Web pages for faster transmission to compatible browsers. Dynamic pages must be individually compressed, but compressed static Web pages are retained in a configurable cache to provide extra performance gains for subsequent requests. IIS 5.0 also provides the server-side support for Microsoft's new Web Distributed Authoring and Versioning (WebDAV), an extension to HTTP 1.1 that enables remote authors to manage (create, move, or delete) files and directories on a server over an HTTP connection.

SECURITY

IIS 5.0 also includes a few new security features. The product has always supported several authentication mechanisms: Anonymous, Basic, NT LAN Manager, and Windows NT challenge/response. The new Digest authentication method transmits password hash values rather than the passwords themselves. Digest authentication is a substantial improvement over Basic authentication—which passes the password unencrypted—because it is generally not feasible to decrypt hash values.

Windows NT challenge/response is now called integrated Windows authentication and has been enhanced to support the Kerberos v5 authentication protocol implemented in Windows 2000. Kerberos offers several advantages, perhaps the most important of which is the abil-

Detecting the Windows Desktop Update

The Windows Desktop Update is installed as part of Windows 98, and optionally with Internet Explorer 4 (but not Internet Explorer 5). How can you be sure the WDU is present on a particular system? Here are two simple tests you can try:

- Right-click the taskbar. If the pop-up menu includes a `Toolbars` item, the WDU is present.
- Right-click an item in the `Programs` menu. If a pop-up menu appears, the WDU is present.

Other tests are appropriate if you're writing scripts or programs that rely on features of the WDU. Examine the Registry value `IsInstalled` in the key `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Active Setup\Installed Components\{89820200-ECBD-11cf-8B85-00AA005B4395}`. If this value's data is `1`, the WDU is installed.

Another approach, one that avoids the Registry, is to call the `FindWindow()` API function and search for a window of class `BaseBar`. This is the window class for the enhanced `Start` menu installed by the WDU. If you find a window of this class, the WDU is present. —Neil J. Rubenking.

When Is a Full Disk Not Full?

I wanted to determine the fixed number of entries the root directory of a RAM disk holds, so I filled each of my three RAM disks. I got different results each time. What gives?

HARLEY FLANDERS
via the Internet

The number of directory entries in the root directory is indeed fixed, but the number of entries for each file can vary. An old-fashioned "short filename" uses one entry, but if even one letter of the name is lowercase, it will require two entries. Longer filenames require still more entries.

A standard 1.44MB floppy disk's root directory can hold 224 filenames of the form `TEST0001.TMP` but only 112 filenames of the

form `Test0001.TMP` and only 74 names in the `TestTest0001.TMP` format.

There's a simple solution to this problem. Instead of copying files to the root directory of a floppy or RAM disk, create a single subdirectory and copy the files into it. Subdirectories can expand as needed, limited only by the disk's capacity. —NJR

Add a DWORD Registry Value from an INF File

How do you add a Registry value of type DWORD using an INF file in Windows 95? Also, is it possible to invoke a program from an INF file?

THO NGUYEN
via the Internet

Among their other capabilities, INF files can be used to add or remove Registry keys and values. Each line in the `AddReg` section adds a key, a key and a value, or a key, a value, and data. The flags argument before the actual data indicates the data type. A `0` in the lowest bit indicates a string value; a `1` means the data is of another type. Several other bits specify exactly what type; `0x10000` is the code for a DWORD value. For Win 95 compatibility, the flag must be expressed as a decimal number, and the data as four hexadecimal bytes.

This very simple INF file adds a DWORD value with the data `00C0FFEE`. Save it as TEST.INF, right-click it in Explorer, and choose `Install`.

```
[Version]
Signature="$Chicago$"
[DefaultInstall]
AddReg=MyAddReg
[MyAddReg]
HKLM,ATest,"A
DWORD",65537,ee,ff,c0,00
```

You can only launch a program from an INF file indirectly, by placing the program in the RunOnce Registry key. —NJR

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ity to pass authentication credentials to other computers that also support Kerberos—including those running non-Windows operating systems. This ability to delegate authentication to another computer makes it easier to scale a Web site by using separate machines for Web servers and database servers.

Previous solutions, such as keeping all services on one box, executing all client requests in the same security context, or hard-coding security credentials into script files, tended to weaken the security architecture.

IIS 5.0 also supports Server-Gated Cryptography (SGC) and Fortezza. SGC (RFC 2069), which requires a special certificate, allows financial institutions with export versions of IIS to use strong, 128-bit encryption. Fortezza —a registered trademark of the US National Security Agency—is a US government messaging security standard written to the Defense Message System security architecture (www.armadillo.huntsville.al.us).

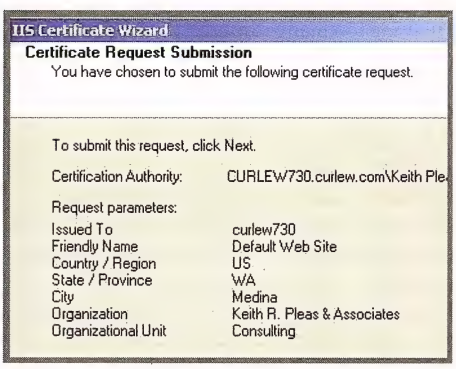


FIGURE 2: The Certificate Wizard helps you easily create certificates to enable secure SSL communications.

Windows 2000 includes Certificate Server 2.0, which provides substantially improved support for digital certificates over the rather rudimentary version introduced with the Windows NT Option Pack. Certificate support is also better integrated with IIS: A new Web Server Certificate Wizard (Figure 2) simplifies creating a certificate request to enable secure SSL communications. A second wizard helps administrators configure certificate trust lists (CTLs). A CTL is a signed list of root certification authorities (CAs) for a particlar site. CTLs can be configured on a per-site basis, which is particularly useful for Internet service providers who must support multiple Web sites.

PROGRAMMABILITY

The application programmability of IIS 5.0 has also been enhanced. Both Active Server Pages (ASP), which is the primary mechanism for launching dynamic content under IIS, and the programmability objects themselves have improved performance as well as new features.

ASP provides a new ASPError object with corresponding error-handling capability, so developers can trap errors in script files. ASP also supports new flow-control capabilities that allow the server to execute other pages without the overhead of round trips required by traditional server-side redirects.

Performance has been greatly improved for scriptless ASP pages. Many sites use the ASP file extension for all pages so they don't have to change links and indexes if they subsequently add script to what was previously an HTML-only page.

Unfortunately, this shortcut incurred a penalty in previous versions of ASP, which loaded the default scripting engine even when there was no code. A new check in the parsing stage short-circuits this problem. ASP now detects when executing requests are blocked by (waiting on) external components and automatically creates additional threads to allow other requests to continue processing.

COMPONENTS

One of the most interesting new features is script encoding (also known as script obfuscation). IIS 5.0 includes the latest Microsoft scripting engines—VBScript 5.0 and Jscript 5.0—both of which support this feature. In script encoding, scripts that were previously stored as plain text are encoded through a simple transformation (similar to the uuencoding) to render them indecipherable to casual users. Encoded scripts are then decoded at runtime by the script engine. While not a truly secure solution, this can prevent most casual users from examining scripts.

ASP also now supports Windows Script Components, which can be used to turn scripts into reusable Component Object Model (COM) components for use by ASP and other COM-compliant programs.

ASP comes with more than a dozen pre-built components for things like logging, using counters, and accessing data and files. All of the components are faster and more scalable, and the Browser Capabilities tool has been enhanced to support capabilities described in cookies sent by the browser. This provides additional flexibility in running server code based on features supported by the target client.

IIS 5.0 gets some immediate benefits—such as the new security and administrative features—just by being bundled with Windows 2000. But the entire product has been revamped to improve performance and implement new features that keep up with the latest Internet standards and provide a solid platform for Web-based applications. For more information, visit **www.microsoft.com/windows2000/guide/server/features/web.asp.**

Accept Cookies by Site

CookieCop lets you decide which Web sites are allowed to deposit cookies onto your hard disk. By Mark Sweeney

As you surf the Web, information about your identity or the actions you take while visiting a site is sometimes stored on your hard disk in the form of cookies. Web sites retrieve these cookies on your next visit to obtain information about you. Most sites use cookies for legitimate purposes, such as storing password or account information so that you don't have to reenter it, and some sites don't work unless your browser accepts cookies. But cookies offer the potential for abuse and can clutter up your hard disk, so most browsers let you choose whether or not to accept them.

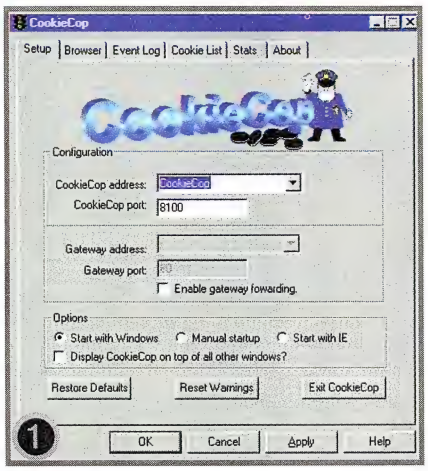
The problem is that the setting that controls your acceptance or refusal of cookies is global: you can accept all cookies or no cookies, but not some cookies. CookieCop lets you accept or reject cookies by site. Since it runs as a proxy server, it can be used with virtually any browser.

CookieCop runs under Microsoft Windows 95, Windows 98, and Windows NT 4.0. An article about how to use CookieCop and about the programming techniques used in its creation is available on our Web site at www.zdnet.com.au/swlib. A link to download the utility and its source code can also be found there.

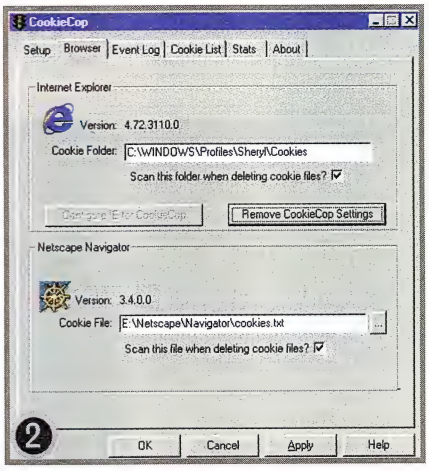
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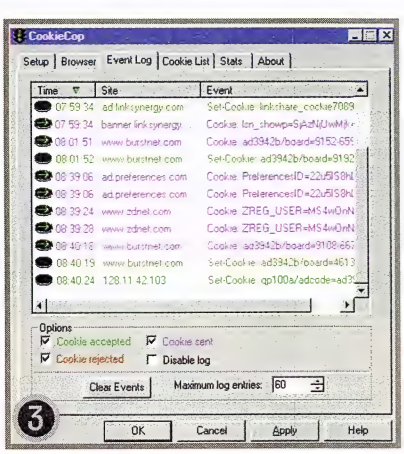


CookieCop runs as a proxy server, so it can be used with any proxy-capable browser. It is also compatible with other proxy servers such as firewalls. You can start CookieCop automatically when you run Windows or your browser.

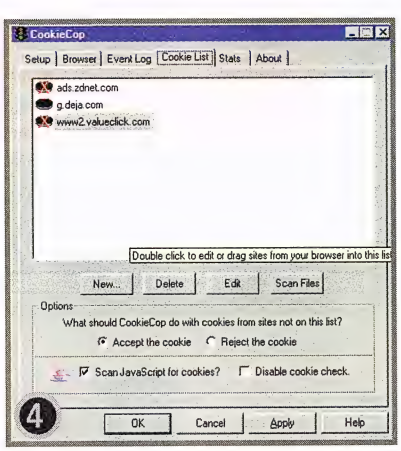


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CANON BJC-600/610/620	16	5-BKL
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21	45	19-BKL
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BC-20	9	18-BKL
CANON BJC-6000	6	46-BKL
HP Desk Jet 400/500 Series	6	8A-BKL
HP Desk Jet 600/660/690 Series	6	8B-BKL
HP Desk Jet 700/850C/855C/870C/890C/1000C Series	6	29-BKL
HP Deskjet 300 Series & Olivetti JP's!	8	7-BKL
EPSON Stylus 400/800/800+/1000	8	1-BKL
EPSON Stylus Colour /PRO/XL	8	2-BKL
EPSON Stylus 820/colour II/IIs	12	23-BKL
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	12	33A-BKL
EPSON Stylus Colour 440/460/640/660/700/740/760/900	12	33B-BKL
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CANON BJC-600/610/620	3x8	10-CLR
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21	3x30	17-CLR
CANON BJC-6000	3x4	47-CLR
HP Colour Desk Jet 300/400/500 Series & Olivetti!	3x12	14A-CLR
HP Colour Desk Jet 600C/660C/690C Series	3x12	14B-CLR
HP Desk Jet 850C/855C/870C/1000C Series	3x3	30A-CLR
HP Desk Jet 710/720/890 Series	3x3	30B-CLR
EPSON Stylus Colour /PRO/XL	3x4	16-CLR
EPSON Stylus 820/colour II/IIs	3x12	24-CLR
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	3x12	34A-CLR
EPSON Stylus Colour 440/460/640/660/700/740/760/900	3x12	34B-CLR
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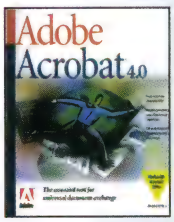
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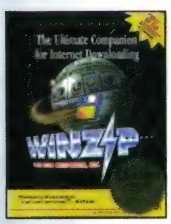


Corel WordPerfect Office 2000 Standard

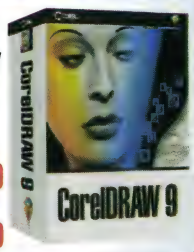
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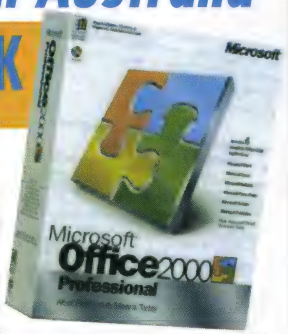
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$100 CASHBACK
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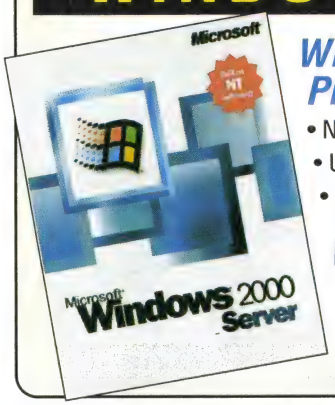
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• Office 2000 Prem. - Upgrade	$549
• Office 2000 Prem. - New Install*	$668
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• Office 2000 Std. - New Install*	$499
• Office 2000 Pro. - Upgrade	$490
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** Upgrade bundle with competitive product - limited stocks*

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• Upgrade from NT W/stat.	$216

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• Upgrade +5 Clients	$745
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WHILE STOCKS LAST

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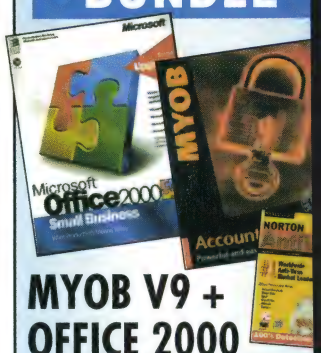
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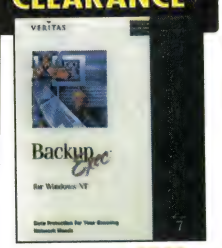
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Dreamweaver Version 3



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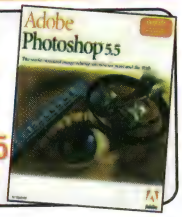


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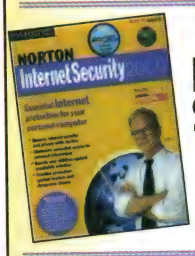
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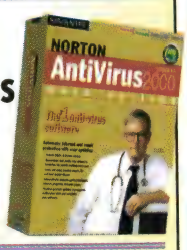
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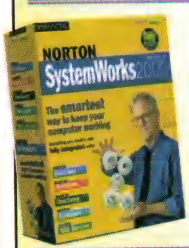




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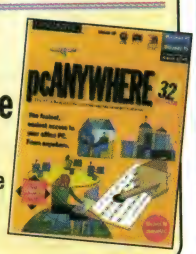
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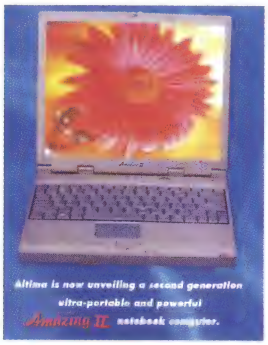
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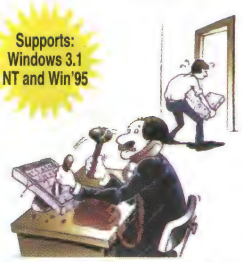
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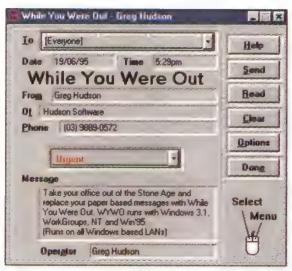
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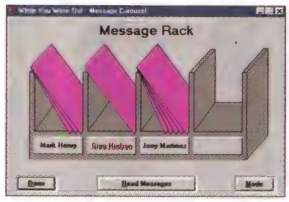
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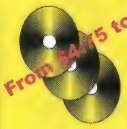
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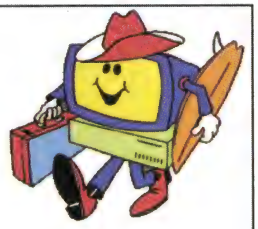
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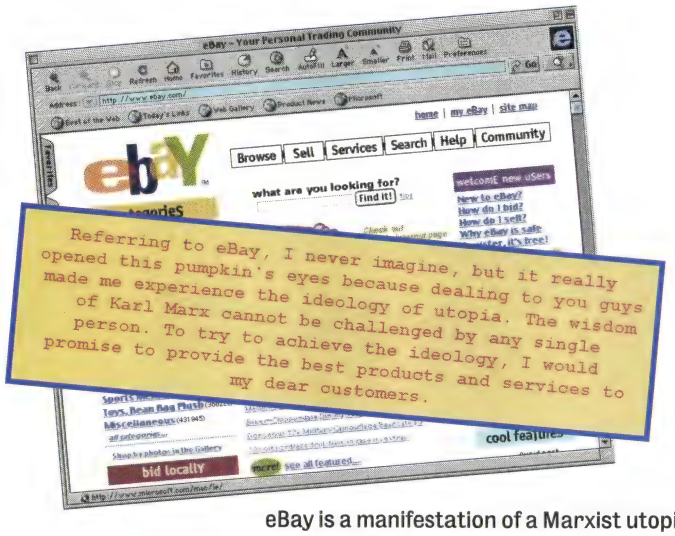
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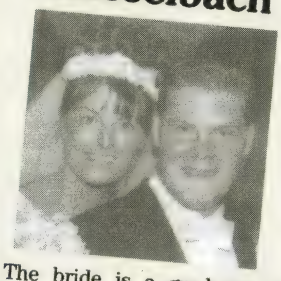
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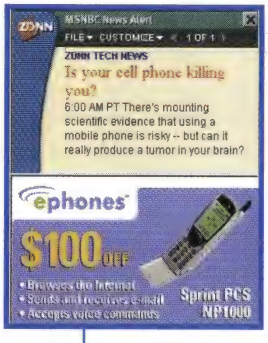
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The bride is a graduate of Southern Illinois University at Carbondale and is a radiology technologist at University of Missouri in Columbia.

The bridegroom is a graduate of University of Missouri and is a computer there.

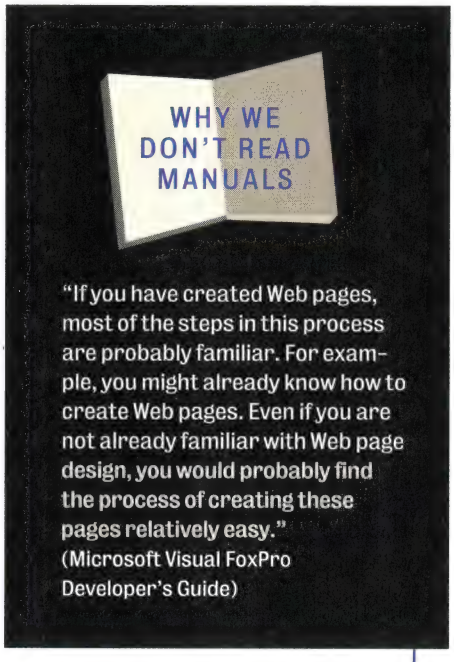
Isn't it romantic? They're marrying cyborgs in the US now! (US newspaper)



You gotta wonder if the advertiser paid extra for this premuim placement. (MSNBC)

Studio Display LCD monitor from Apple Computer Inc. of Cupertino, Calif. [*GCN*, Aug. 9, Page 29]. Pro: beautiful color depth. Con: not viewable beyond 180-degree angle.

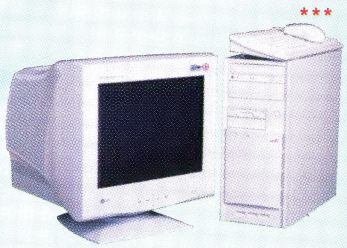
In other words, you can't see the screen when you stand behind it. (US Government Computer News)



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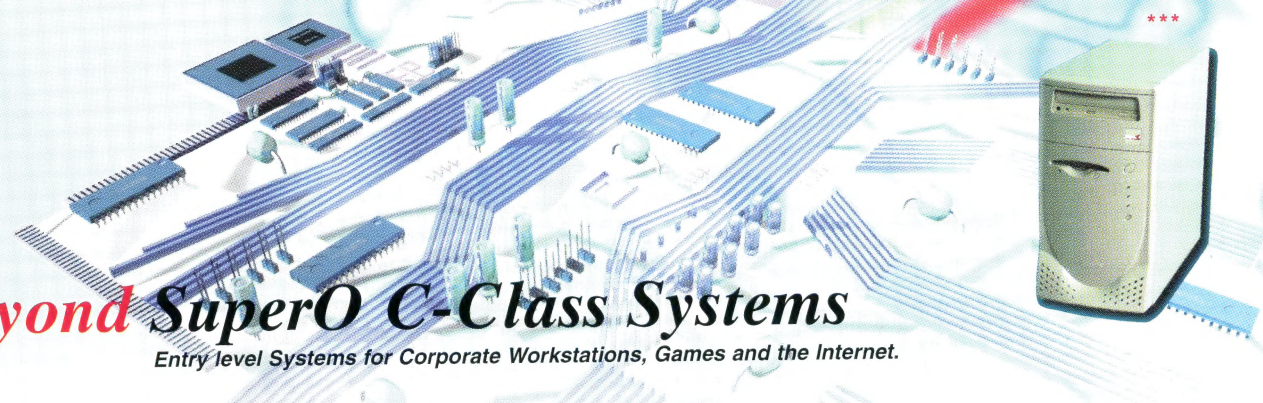
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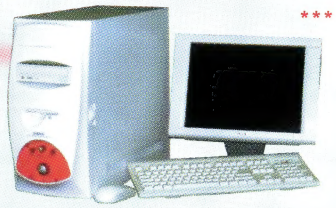
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13GB Ultra DMA HDD
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48x CD-ROM Drive
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